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DRAFT MARINE CORPS UM 10690A-10/5

AFATDS Operator's Notebook for AFATDS 99

1 December 2001

DRAFT TB 11-7025-297-10
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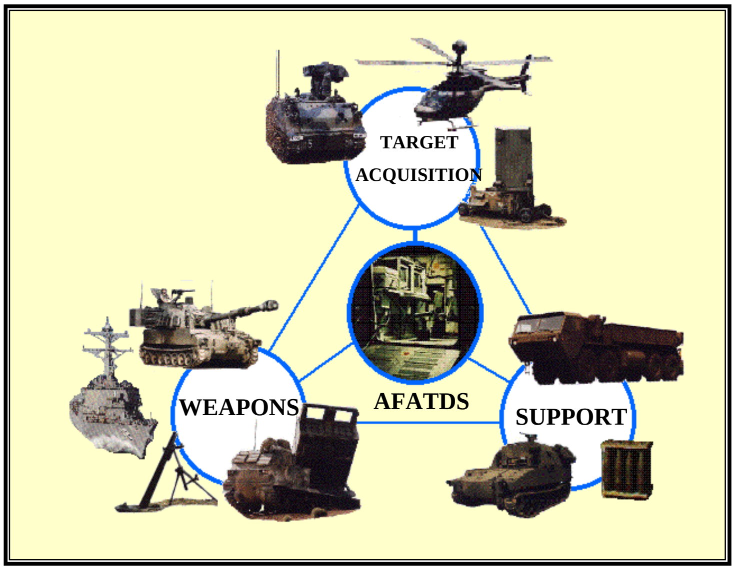
AFATDS - The Controller of the Fire Support System



System Overview

A. AFATDS System. AFATDS is a multi-service (Army and USMC) automated command and control system for fire support operations. AFATDS provides the singular Command, Control, and Communications (C3) solution to the complex problem of integrating and controlling fire support assets. As the Fire Support Battlefield Functional Area (BFA) Control system of the Army Battlefield Command System (ABCS), AFATDS provides the commander with:

- Integrated, responsive, and reliable Fire Support.
- Vastly improved flexibility in providing inputs such as critical commander's criteria and priority of fire information.
- A distributed data base which supports horizontal and vertical Continuity of Operations throughout the battlefield.
- A user friendly set of screens and help prompts.
- The ability to attack the Right Target, at the Right Time, with the Right Munitions and the Right Weapon System.

AFATDS is designed to interoperate with all Fire Support Subsystems, ABCS BFAs, Joint systems (such as Joint Surveillance Target Attack Radar System (JSTARS)), and the allied nations of Germany, the United Kingdom, and France. AFATDS uses the programmable Tactical Communication Interface Module (TCIM) to operate over wire (2W/4W), Combat Net Radio (CNR), Mobile Subscriber Equipment (MSE), and the Enhanced Position Location and Reporting System (EPLRS) and LAN for SIPRNET/NIPRNET operations.

AFATDS supports the five Fire Support functional areas:

- Fire Support Planning. Fire Support Planning provides integration of field artillery, mortars, naval surface fire support, aviation (helicopters), and air support into the force commander's scheme of maneuver. AFATDS helps create a Fire Support annex to the commander’s Operation Plan (OPLAN) and a Field Artillery Support Plan.

- Fire Support Execution. Fire Support Execution is guided by fire support and field artillery support plans. It performs sensor employment, target processing, attack systems analysis, technical fire direction for cannon units, tactical fire control for MLRS units, and target damage assessment.

- Movement Control. Movement Control manages and coordinates the movement of field artillery units and sensors and coordinates the movement of fire support units and sensors.

- Field Artillery Mission Support. Field Artillery Mission Support includes functions logistically supporting the field artillery system. It creates and maintains supply inventory files, supply requests, and supply reports.

- Field Artillery Fire Direction Operations. Field Artillery Fire Direction Operations includes the collection and maintenance of weapon, fire unit, and ammunition status data required for day-to-day operations. This information is provided in either detailed or aggregate form to appropriate Operations Centers in support of both planning and execution requirements.

The AFATDS software is designed to operate on common hardware at Fire Direction Centers (FDC), Fire Support Elements (FSE)/Fire Support Coordination Centers (FSCC), Command Posts (CP), Tactical Air Control Centers (TACC), and Direct Air Support Centers (DASC) located throughout the battlefield. Each FSCOORD/FA Commander and Fire

Support Officers at Battalion and above will be equipped with AFATDS. AFATDS provides distributed processing and ensures commonalty and interoperability within the Fire Support BFA.

B. AFATDS 99 Implementation. The AFATDS 99 software has two implementations, the First Digitized Division (FDD) implementation and the Non-First Digitized Division (Non-FDD) implementation.

1. First Digitized Division (FDD).

a. The Army Battle Command System (ABCS) is the body of digital Command, Control, Communications, Computers and Intelligence (C4I) systems that will automate the emerging digital force. AFATDS is a part of this overall system concept. This system is also referred to as the First Digitized Division (FDD) software implementation for AFATDS users. Under this concept the AFATDS is part of a Tactical Operations Center client/server environment that is made up of the following Battlefield Functional Area (BFA) software and computer systems.

1). AFATDS – Advanced Field Artillery Tactical Data System (Fire Support)

2). MCS – Maneuver Control System (Plans, Orders, Reports, Friendly Situation, Situational Awareness)

3). CSSCS – Combat Service Support Control System (Personnel, Medical, Maintenance, Supplies)

4). ASAS – All Source Analysis System (Real Time Enemy Situation, IEW)

5). AMDPCS - Air and Missile Defense Planning and Control System

6). FBCB2 – Force XXI Battle Command Brigade and Below

These computer systems will share information to provide situational awareness, command, control, communications, intelligence, logistics, fire support, and all other aspects of the battlefield environment that will allow the commander the ability to fight his force and win in a digital environment.

Several of the software applications incorporated into the ABCS platforms are common throughout the various computer systems. The exchange of mapping data and situational awareness are performed by the Common Tactical Picture (CTP) mapping application and the Overlay Explorer (OE). A Common Message Processing (CMP) application is used to transfer USMTF messages between the various systems. A common database structure, the Joint Common Database (JCDB) is used to allow all of the systems to smoothly and effectively exchange mission critical information. In addition to CTP and the Overlay Explorer, the Plan Manager and Unit Task Organization (UTO) tool is used to exchange operation orders / plans and to conduct task organization planning for combat operations. A complete suite of office software package applications is available on all platforms to perform word processing, spreadsheet functions, and develop planning briefs.

b. When AFATDS is required to operate in a FDD environment, it may be required to assume the role of TOC Server. In most situations the Maneuver Control System (MCS) or All Source Analysis System (ASAS) computer systems will be the TOC server and AFATDS will operate in that cell as a client.

In the rare situations when AFATDS is required to be the TOC Server, it must be able to provide the following functions as the TOC node server.

1). An AFATDS TOC Server will provide IP addresses to all of the clients in the node during the boot procedure. The Dynamic Host Control Protocol (DHCP) server function will assign fixed and dynamic IP addresses to each node as it joins the TOC cell.

2). The Domain Name Server (DNS) function also runs on the TOC server to support hostname-to-IP address lookup.

3). A Command and Control Registry (C2R) stores names on the TOC Server and provides this information to all of the TOC cell nodes.

4). The Lightweight Directory Access Protocol (LDAP) uses the C2R to look up and if necessary modify the contents of the C2R. The LDAP is a distributed database that stores network information, such as organizations, users, devices, and networks.

5). A Network Time Protocol (NTP) provides a common time to the network. The NTP Server receives this time standard from the Global Positioning System and broadcasts it to all of the cell nodes.

The Future XXI Battle Command Brigade and Below (FBCB2) system can only transmit messages to a single address (Unicast messaging). But, its message may be intended for a different addressee within the ABCS TOC cell node. The server, be it AFATDS, MCS, or ASAS, must be able to receive and forward these JVMF messages from FBCB2 as needed. It will do this by reviewing the message header information provided in the transmission from the FBCB2 device. It will then forward that information to the intended recipient.

2. Non-First Digitized Division (Non-FDD). The Non-FDD implementation contains all of the AFATDS fire support mission functionality that is contained in the FDD implementation. The Non-FDD implementation does not contain all of the common software applications that are incorporated into the Army Battlefield Control System (ABCS) systems to enable them to function as a part of a Tactical Operations Center client/server environment with other ABCS systems. The Non-FDD implementation does not support the Joint Common Database (JCDB) and the Common Tactical Picture (CTP) for situational awareness. The Non-FDD also does not support the ability to automatically acquire hostname-to-IP addresses nor serve as a TOC server.

Hardware Configuration
UCU (SUN) Hardware Configuration

A. <u>SCSI Switch Settings</u>. In order for the different devices in the computer system (for example -- hard drives, TCIM's, optical disk, etc.) to communicate with each other, the SCSI switches must be set as they are shown in this table. This must be done before hardware is powered ON.

Table 1. SCSI Switch Settings

Device	**Addr**	**Switch Location**
TCIM 1	4	Push-button switch on side of TCIM
TCIM 2	5	Push-button switch on side of TCIM
CD-ROM	6	Push button switch on front panel of UCU (V2)
Optical Disk	2	Push button switch on front panel of UCU (V2)
RHDD	3	Push button switch on front panel of UCU (V2)
3.5 Floppy	N/A	This is not a SCSI device

SCSI Address Switches on UCU V2 Front Panel
(behind drive access door)

3	0	6	2

WARNING!!

Never disconnect SCSI cables or change SCSI switches while the equipment is powered ON.

B. Equipment Setup Instructions. The following steps show how to properly setup and wire an AFATDS workstation. See Figure 1 below for reference. For information on connecting the video monitor, SCSI cables, wire line adapter, and LAN, see the Common OPFAC Configuration section of this guide.

1. Connect 120 VAC power cord to UPS AC INPUT connector or 28 VDC power cord to UPS DC INPUT connector.

2. Connect power strip to UPS 120 V AC Output connector.

3. Connect power cord from SHRD (monitor) to power strip.

4. Connect power cord from UCU to power strip.

5. IF USING TCIM(s) -- For each TCIM used, connect power cord from TCIM power supply (EPM) to power strip, and connect DC power cord from EPM to TCIM.

6. IF USING LASER PRINTER -- Connect AC power cord from printer to an external power source. Do not plug Laser Printer into UPS power strip.

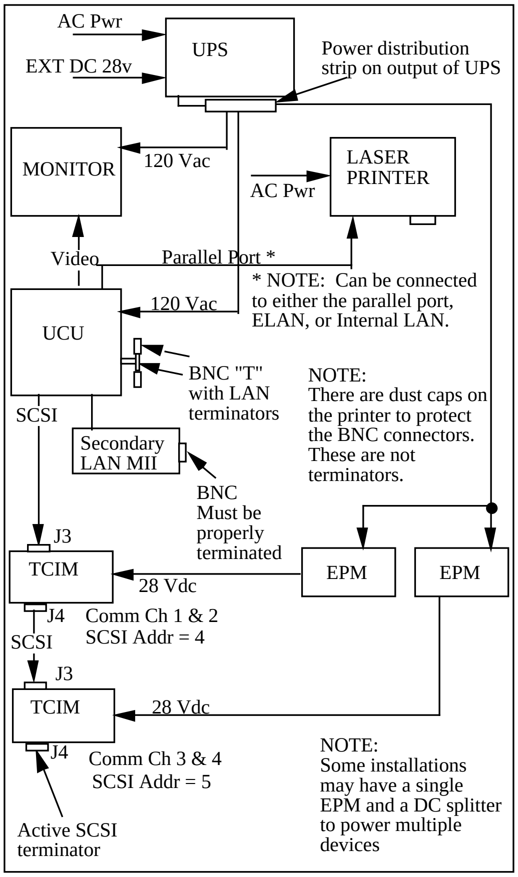


Figure 1. Standard UCU FSCT Arrangement

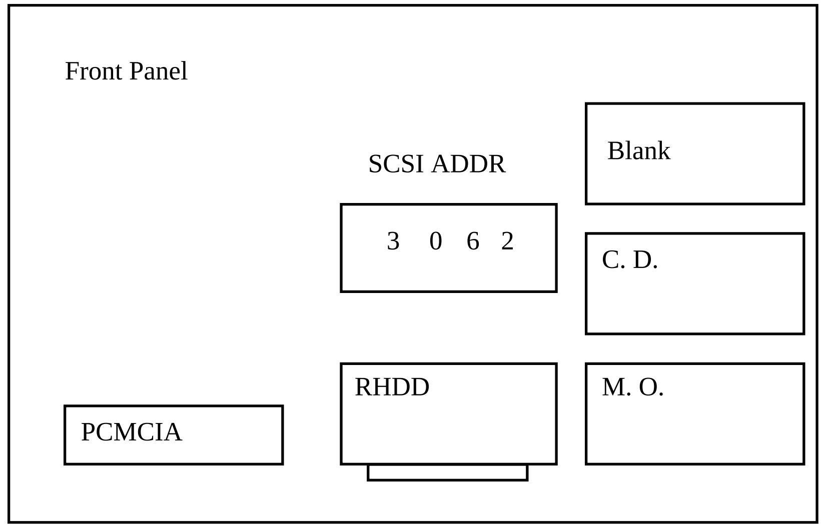


Figure 2. Standard UCU Front Panel View

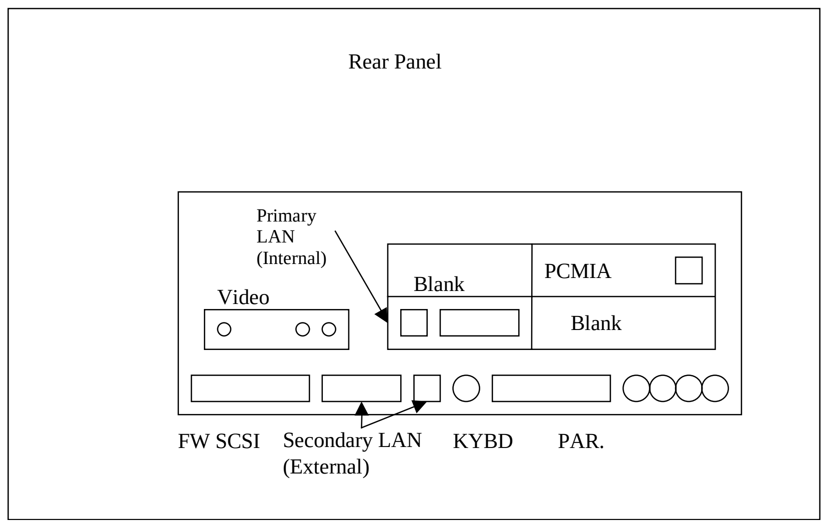


Figure 3. Standard UCU Rear Panel View

Hardware Configuration
UCU-2 / FDD Hardware Configuration

A. SCSI Switch Settings. In order for the different devices in the computer system (for example -- hard drives, TCIM's, optical disk, etc.) to communicate with each other, the SCSI switches must be set as they are shown in this table. This must be done before hardware is powered ON.

Table 2. SCSI Switch Settings

Device	Addr	Switch Location
TCIM 1	4	Push-button switch on side of TCIM
TCIM 2	5	Push-button switch on side of TCIM
CD-ROM	6	Push button switch on front panel of UCU (V2)
Optical Disk	2	Push button switch on front panel of UCU (V2)
RHDD #1	3	Push button switch on front panel of UCU (V2)
RHDD #2	1	(Initially Unused)
3.5 Floppy	N/A	This is not a SCSI device

SCSI Address Switches on UCU V2 Front Panel
(behind drive access door)

3	2	6	1

WARNING!!

Never disconnect SCSI cables or change SCSI switches while the equipment is powered ON.

B. Equipment Setup Instructions. The following steps show how to properly setup and wire an AFATDS workstation. See Figure 4 below for reference. For information on connecting the video monitor, SCSI cables, wire line adapter, and LAN, see the Common OPFAC Configuration section of this guide.

1. Connect 120 VAC power cord to UPS AC INPUT connector or 28 VDC power cord to UPS DC INPUT connector.

2. Connect power strip to UPS 120 V AC Output connector.

3. Connect power cord from SHRD (monitor) to power strip.

4. Connect power cord from UCU to power strip.

5. IF USING TCIM(s) -- For each TCIM used, connect power cord from TCIM power supply (EPM) to power strip, and connect DC power cord from EPM to TCIM.

6. IF USING LASER PRINTER -- Connect AC power cord from printer to an external power source. Do not plug Laser Printer into UPS power strip.

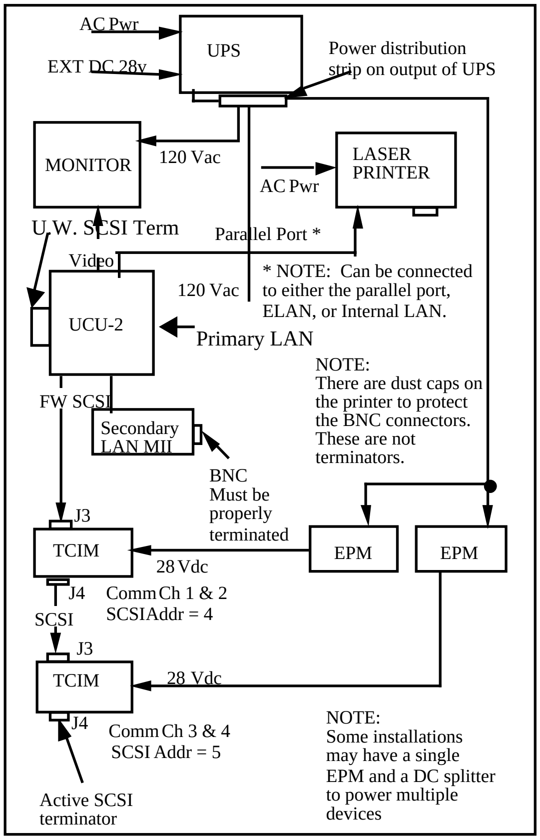


Figure 4. Standard UCU FSCT Arrangement

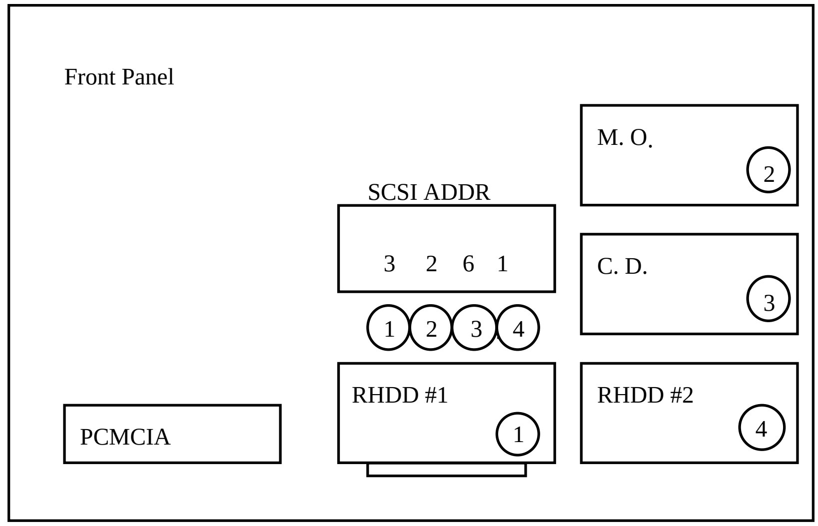


Figure 5. UCU-2 / FDD Configuration Front Panel View

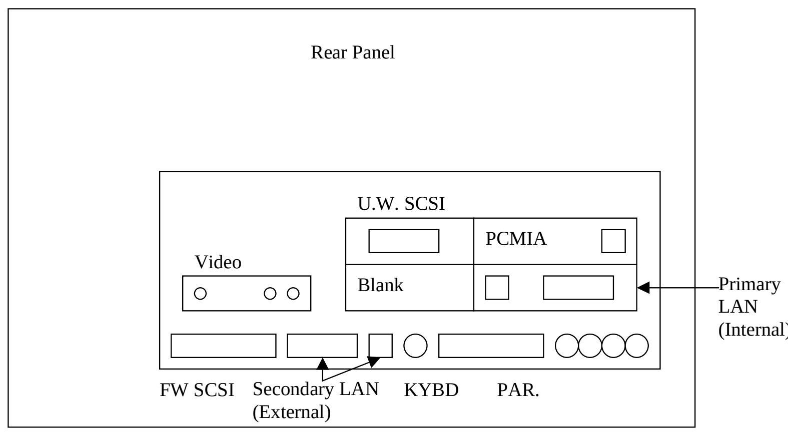


Figure 6. UCU-2 / FDD Rear Panel View

Hardware Configuration
CCU-2 (SUN) Hardware Configuration

A. SCSI Switch Settings. In order for the different devices in the computer system (for example -- hard drives, TCIM's, Jaz disk, CDROM drive etc.) to communicate with each other, the SCSI switches must be set as they are shown in this table. This must be done before hardware is powered ON.

Table 3. SCSI Switch Settings

Device	Addr	Switch Location
3.5 Floppy	N/A	This is not a SCSI device
RHDD	3	Push button switch on front panel of CCU-2
Empty Bay	0	Push button switch on front panel of CCU-2
CDROM	6	Push button switch on front panel of CCU-2
Jaz Drive	2	Switch button on front panel of CCU-2

IMPORTANT!!

Jaz disks used in the CCU-2 workstation must be labeled "IBM Compatible". The disk must not have been used to store files from a PC. The PC will place a file system on the Jaz disk that is incompatible with the CCU-2. If a disk with a PC file system is inserted into the CCU-2, the Jaz drive will stop responding to the CCU-2 workstation's commands. This problem will disappear when a different Jaz disk, without a PC file system, is inserted. This limitation means that Jaz disks cannot be used to move files between a PC and a CCU-2.

Jaz disks that have been used in a PC can be low-level formatted on the PC using fdisk. Jaz disks cannot be low-level formatted on a CCU-2. A Jaz disk that has been low-level formatted on a PC, but which has not had a PC file system put on it, will work in a CCU-2. This method can be used to erase Jaz disks used in a PC so that they can be used in a CCU-2.

NOTE!

For CCU-2 use above addresses and set SCSI ID switches to correct number. Sequence will vary depending on which media bays individual devices are inserted.

The SCSI switches on the CCU-2 are arranged in a vertical row. The addresses must be set, from top to bottom, 3, 0, 6, and 2.

WARNING!!

Never disconnect SCSI cables or change SCSI switches while the equipment is powered ON.

B. Equipment Setup Instructions. See Figure 7 for external connections and PCI card positions.

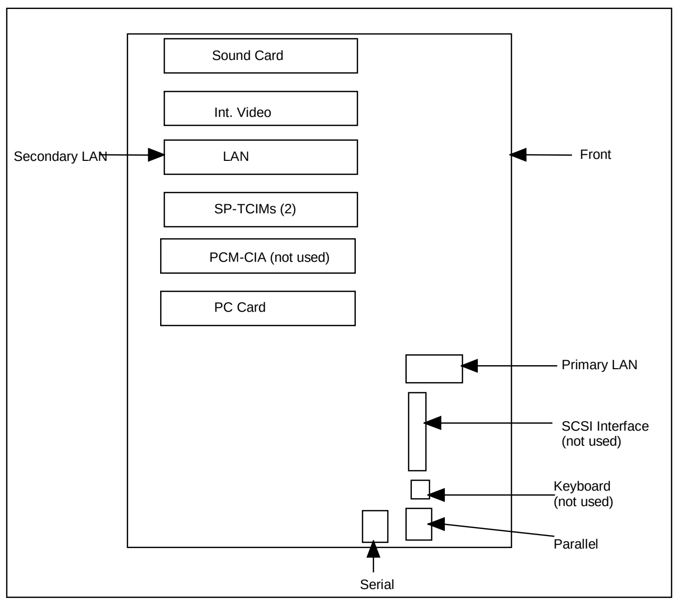
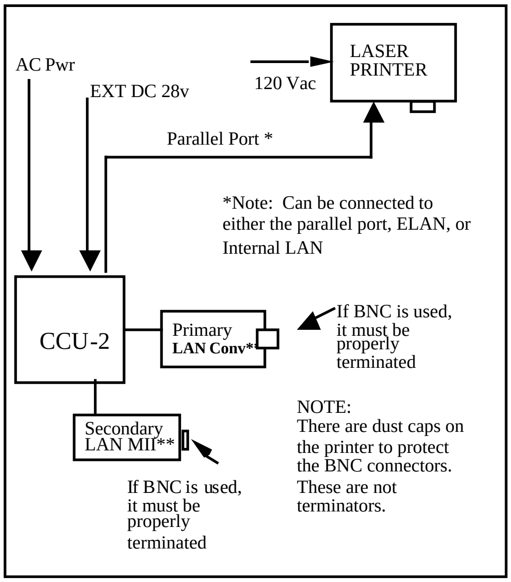


Figure 7. CCU-2 Left Side View

The following steps show how to properly setup and wire an AFATDS workstation. See Figure 8 below for reference. For information on connecting the video monitor, SCSI cables, wire line adapter, and LAN, see the Common OPFAC Configuration section of this guide.

1. Connect 120 VAC power cord to AC INPUT connector or 28 VDC power cord to DC INPUT connector.

2. IF USING LASER PRINTER -- Connect AC power cord from printer to an external power source. Do <u>not</u> plug Laser Printer into UPS power strip. (There is no UPS issued with the CCU-2.)



** May not be used if LAN is implemented as 10/100 Base T Network

Figure 8. Standard CCU-2 Arrangement

C. <u>SP-TCIM Cable Configuration Options</u>. Each SP-TCIM has two channels. The capabilities of each SP-TCIM channel are not identical. Table 4 shows the AFATDS channel assignments for each SP-TCIM slot. Table 5 shows the channel capabilities for each of the different SP-TCIM cable possibilities.

Table 4. AFATDS Channel Assignment for Each SP-TCIM Slot

SP-TCIM Slot	AFATDS Channels
SP-TCIM 2	Channels 7 & 8
SP-TCIM 1	Channels 5 & 6

Table 5. SP-TCIM Channel Capabilities Per Cable Type

Cable	SP-TCIM Channel 1 / AFATDS Channel 5 or 7	SP-TCIM Channel 2 / AFATDS Channel 6 or 8
Single Channel SINCGARS Cable	SINCGARS FSK or NRZ 110A/WB, 110A/NB	Disabled
Dual Channel SINCGARS Cable	SINCGARS FSK or NRZ 110A/WB, 110A/NB	SINCGARS NRZ
Dual Channel SINCGARS Cable	SINCGARS FSK or NRZ 110A/WB, 110A/NB	Unused
Dual Channel SINCGARS Cable	Unused	SINCGARS NRZ
Single Channel Wire Line Cable	Wire Line CDP or FSK	Disabled
Dual Channel SINCGARS/Wire Line Cable	Wire Line CDP or FSK	SINCGARS NRZ
Single Channel EPLRS Cable	Unused	EPLRS CDP or NRZ
Dual Channel EPLRS/SINCGARS Cable	SINCGARS FSK or NRZ	EPLRS CDP or NRZ
Dual Channel EPLRS/SINCGARS Cable	SINCGARS FSK or NRZ	Unused
Dual Channel EPLRS/SINCGARS Cable	Unused	EPLRS CDP or NRZ

NOTE

Currently units are being issued 2 SP-TCIM's and the following SP-TCIM cables:

1ea. Dual Channel SINCGARS Cable
1 ea. SINCGARS/Wire Line Cable (Wire Line = Channel 5 or 7, SINCGARS = Channel 6 or 8)
1 ea. EPLRS/SINCGARS Cable (EPLRS = Channel 6 or 8, SINCGARS = Channel 5 or 7)

This combination offers the following maximum communications capabilities:

2 Wire Line and 2 radio (see channel 6/8 limitations)
or
1 Wire Line and 3 radio (1 fully capable and 2 limited)
or
4 radio (2 fully capable and 2 limited)

NOTE!

In addition to two SP-TCIMs, the CCU-2 workstation can support up to two external TCIMs. External TCIMs are plugged into the SCSI Interface on the side of the CCU-2 workstation. See the Hardware Configuration: UCU (SUN) Hardware Configuration section for TCIM cabling and addressing instructions.

Hardware Configuration
M1068 Track Configuration

The M1068 track configuration assumes the M1068 internal wiring is operational and grounded properly.

A. Internal M1068 LAN Wiring. Two LAN's exist in the M1068: the internal LAN and the external LAN. The internal LAN is used for multi-workstation connections, and the external LAN is used for connections to other OPFAC's. The M1068 is pre-wired internally but requires the operator to understand the wiring in order to use it properly. The M1068 wiring is shown below. This wiring diagram represents only one of the two LAN's in the track; both have identical wiring configurations.

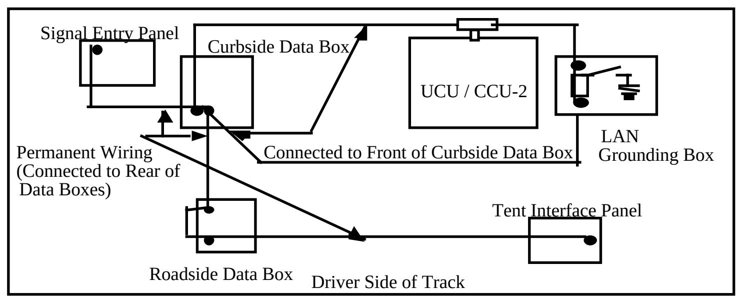


Figure 9. M1068 Internal Wiring.

The M1068 has LAN connections on the front and rear of the vehicle. When the LAN is not in use, these connections should be terminated with a LAN terminator. No LAN tee should ever be placed on these connections. These two connections are generally the only ones the operator must use to connect LANs between tracks.

The M1068 LAN has a grounding box near the curbside rear of the vehicle. When set to the GROUNDED position, the shield of the LAN cable will be grounded to the M1068 common ground.

IMPORTANT!!

One and only one M1068 connected on a LAN should have its LAN grounded. This will ground the entire LAN and prevent floating grounds.

When connecting a LAN between M1068 SICPS vehicles, the same rules apply but are restated as follows:

- A LAN must not be connected to a vehicle through a LAN tee.
- A LAN must begin with a LAN terminator, be cabled from one vehicle to the next until all have been connected, and end with a LAN terminator.
- A LAN must not loop; that is, the beginning and end of the LAN must be terminated and may not be cabled together.

B. Multi-workstation LAN Connections. The multi-workstation LAN allows two or more M1068 tracks (each with one or two workstations) to be connected together to form one OPFAC. This LAN is connected to the vehicle at the connections marked as LAN. The following figure shows three vehicles connected on a LAN with proper termination. Note that no LAN tees are used when connecting between vehicles. This is because the LAN tee is already connected to the UCU/CCU-2 inside the vehicle. The UCU uses an MII to facilitate multi-workstation internal LAN operations. The MII consists of a cable, labeled "P1(MII/THINLAN CONVERTER)" and the MII unit (this is a small silver box) with a BNC connector on one end with a large 50-pin connector above it). The small end of the cable plugs into the small 40-pin port on the back of the UCU/CCU-2 inside the M1068.

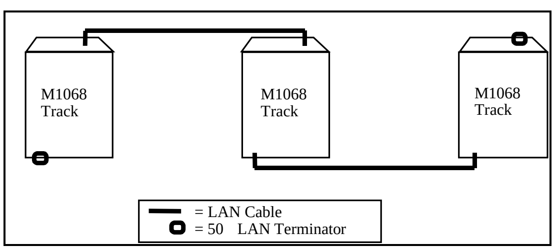


Figure 10. LAN Connections between Vehicles for both Multi-workstation and External LAN's.

C. <u>External LAN Connections</u>. The external LAN allows two or more M1068 tracks or other vehicles to be connected together to form a communications network. This LAN is connected to the vehicle at the connections marked as EXTERNAL LAN. Figure 10 shows three vehicles connected on a LAN with proper termination. Note that no LAN tees are used when connecting between vehicles. This is because the LAN tee is already connected to the UCU/CCU-2 inside the M1068.

If a stand-alone computer must be connected to one or more vehicles, follow rules for computer LAN connections while keeping to the rules for vehicle LAN connections. For example, suppose two vehicles and two stand-alone computers are connected together on an external LAN. Figure 11 shows the proper connections, terminators, and use of LAN tees.

NOTE!

There is currently no standard configuration for external LAN configurations defined for the UCU-2 / FDD configuration workstations.

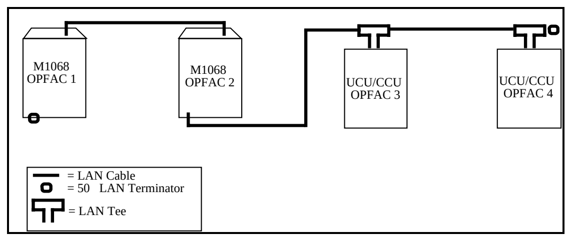


Figure 11. Vehicles and Computers connected on an External LAN

NOTE!

Maximum total cable length for 10 Base 2 (Thin COAX) LANs is 185 meters.

Hardware Configuration
Common OPFAC Configuration

The information in this section applies to the UCU (SUN) and CCU-2 (SUN) OPFAC hardware configurations.

A. Video Monitor and Keyboard / Trackball. (UCU Only)

1. Connect RGB cable from SHRD to UCU.

2. Connect 1KYBD/Trackball cable to UCU or CCU-2.

B. SCSI Cable Connections. .

1. IF USING TCIM(s) -- CAREFULLY connect SCSI cable from UCU SCSI port to J3 on TCIM. This cable is fragile and is easily damaged. If using two (2) TCIM's, simply connect another cable from the first TCIM (J4) to the second TCIM (J3).

2. IF NOT USING TCIM's - NOTE: The UCU is designed to be self-terminating and does not require a terminator.

IMPORTANT!!

Ensure that the TCIM with the open SCSI connection has a SCSI terminator attached.

Figure 12 illustrates the proper SCSI configuration.

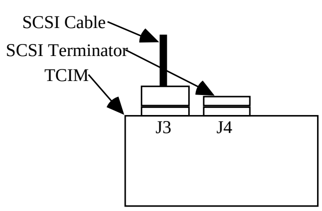


Figure 12. TCIM SCSI Termination.

C. Printer.

IF USING PARALLEL PRINTER -- Connect printer cable between printer parallel Data Connector and UCU/CCU-2.

IF USING LAN PRINTER - Insure printer is connected to an Internal or External LAN and that LAN is terminated properly.

D. Wire Line Adapter. Connect the Wire Line Adapter to one or both of the TCIM's/SP-TCIM's.

E. Hard Drive. Ensure that internal hard drive inside UCU/CCU-2 access door is well seated and locked in place.

F. Local Area Network (LAN). An AFATDS LAN is a high-speed, short-distance communications connection used for computer to computer communications. As currently configured, it operates at approximately 10 Million bps over coaxial cable connected to the UCU equipment with BNC connectors. A 10 Base 2 configuration LAN is relatively simple to connect and operate but is sensitive to the manner in which it is constructed.

Several rules for constructing a 10 Base 2 LAN are given:

- A LAN must be connected to a computer through a LAN tee.
- LAN tees should never be connected to other LAN tees.
- A LAN must begin with a LAN terminator, be cabled from one computer to the next until all have been connected, and end with a LAN terminator.
- A LAN must not loop; that is, the beginning and end of the LAN must be terminated and may not be cabled together.

IMPORTANT!!

Any side of a LAN tee connected to a UCU/CCU-2 or vehicle LAN connection (front or rear) which does not have a cable attached MUST have a LAN terminator.

Make sure that cables and terminator caps are connected on tees rather than directly to the UCU/CCU-2 itself. If connected directly to the UCU/CCU-2, the LAN will not work properly.

If the LAN is not terminated properly it will be turned off when the computers power up. To regain correct operation of the LAN, properly power down the affected computers, correctly terminate the LAN and then re-power the computers.

Also, do not confuse a LAN terminator with a LAN dust cover. A dust cover has nothing inside and just latches on to the LAN connection to keep dust out.

Two different LAN connections exist. The first is the multi-workstation (internal) LAN. This LAN allows two (2) to eight (8) AFATDS workstations to be connected together to form a multi-workstation OPFAC. The second type of LAN is the external LAN. The external LAN is used to connect your AFATDS OPFAC to other AFATDS OPFACs or ABCS devices like MCS, ASAS, etc. Also, two different configurations exist for constructing the LAN connection: the Out of Shelter configuration and the SICPS (Standardized Integrated Command Post System) configuration.

1. Out of Shelter LAN Configuration. The "Out of Shelter" configuration is used when setting up AFATDS outside the SICPS shelter. It may also be used when the LAN connections inside the SICPS are suspect. In this configuration, the operator connects cables, tees and terminators directly to the UCU/CCU-2 hardware.

   a. Multi-workstation LAN Connection. When constructing out of shelter multi-workstation LAN connections, the LAN will be connected directly to the UCU/CCU-2 equipment as shown below. The LAN tees will be connected to the appropriate BNC connector on the MII assembly.

The UCU uses an MII to facilitate multi-workstation external LAN operations. The MII consists of a cable, labeled "P1(MII/THINLAN CONVERTER)" and the MII unit (this is a small silver box) with a BNC connector on one end with a large 50-pin connector above it). The small end of the cable plugs into the small 40-pin port on the back of the UCU.

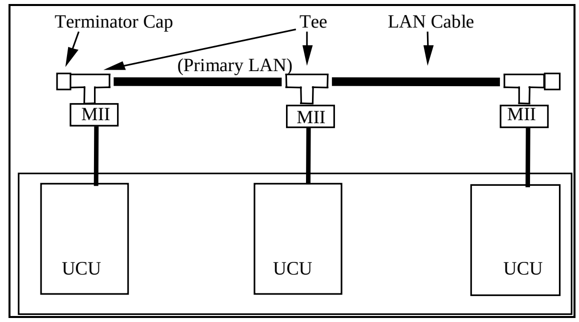


Figure 13. Multi-workstation UCU LAN Out of Shelter.

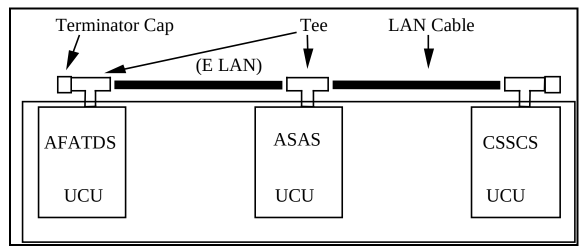


Figure 14. UCU Multi- OPFAC Configuration.

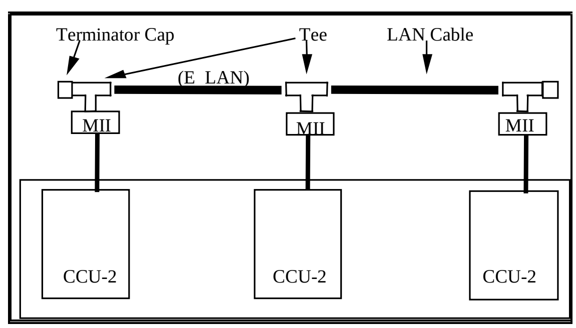


Figure 15. CCU-2 Multi-Workstation Configuration (Internal LAN connections)

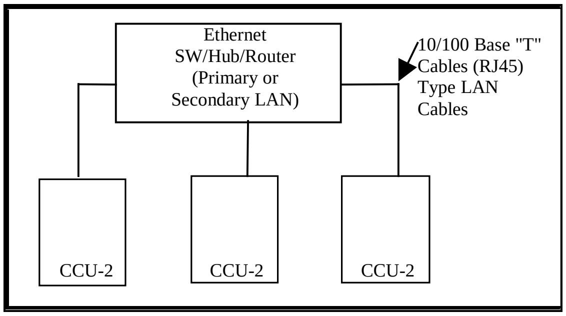


Figure 16. Multi-workstation, Multi OPFAC Configuration Using UTP* Cabling

* UTP = Unified Twisted Pair

b. External LAN Connections. When constructing out of shelter external LAN connections, the LAN will be connected as prescribed above, except the connections will be made to the BNC connectors marked "LAN 2" or the appropriate BNC connector on the rear of the UCU chassis. On the CCU-2 this connection will be made through the TW-Thin LAN converter.

The MII consists of a cable, labeled "P1(MII/THINLAN CONVERTER)" and the MII unit (this is a small silver box) with a BNC connector on one end with a large 15-pin connector above it). The small end of the cable plugs into the small 15-pin receptacle (<-->) on the back of the CCU. The large end of the cable plugs into the large 50-pin connector on the MII. (When in a multi-workstation configuration, the LAN cable is connected to the BNC connector on the MII unit using a "T-connector".)

NOTE!

There is currently no standard configuration for external LAN configurations defined for the UCU-2 / FDD configuration workstations.

G. Communications Media. A communications media is any device or equipment that allows two or more OPFAC’s to communicate. Media used in AFATDS include wireline, SINCGARS radio, EPLRS, MSE, etc.

1. WIRELINE

   a. Connect wireline adapter(s) to connector P2 on external TCIM's or edge connector on SP-TCIM's.

   b. Connect the wire to the binding posts marked for "Transmit/Receive" for the appropriate channel.

   c. Make sure the wireline does not loop; that is, make sure the wire does not begin and end at the same wireline adapter.

2. SINCGARS Radio

   a. Connect six-pin radio interface cables(s) to the radio connectors J1 or J2 on external TCIM's or to P2 or P3 on SP-TCIM Dual Radio Cable.

   b. When the network is using FSK encoding and the radio model is earlier than the PI (e.g., ICOM), connect the radio interface cable through the FSK adapter (1 watt board, amplifier board, etc.) to the right of the radio as shown in Figure 17. Otherwise, connect cable directly to radio as shown in Figure 18.

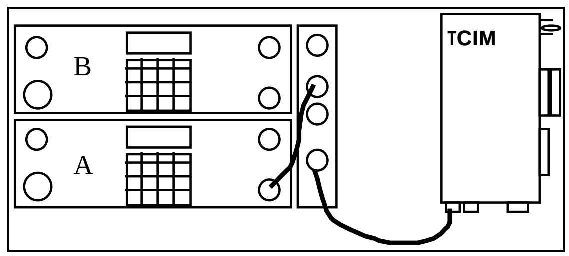


Figure 17. Connecting Radio Cable when using FSK.

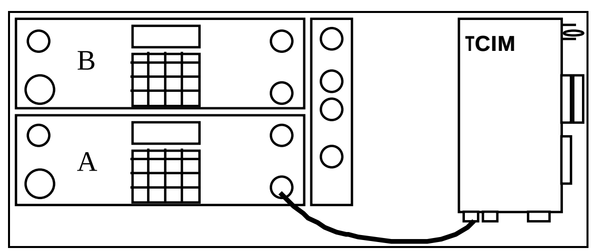


Figure 18. Connecting Radio Cable when not using FSK.

3. EPLRS

   a. Connect external TCIM to EPLRS cable to the connector marked P1 on the external TCIM.

   b. Connect the cable to the back of the EPUU at the host-interface connector marked J2.

   c. The EPLRS corresponds to channel 1 for an external TCIM with SCSI address 1 and to channel 3 for an external TCIM with SCSI address 3. Only 1 EPLRS radio can be connected to a TCIM.

4. MSE

   a. Connect the MSE Telephone to TCIM cable to the connector marked P1 on the external TCIM.

Hardware Configuration
Printer Settings

A. Standard Laser Printer.

1. Parallel Port Printer.

   If using a parallel port printer, ensure the printer is set properly.

   - With the printer powered OFF, set its Front Panel Data Switch to parallel mode.

2. LAN Printer.

   a. Internal LAN (Primary).

At OPFAC

Step	Action
1.	Use normal printer set up procedures. System-Configuration---Printers-----Printer Services---Add Printer
2.	Enter the printer name.
3.	Select PCL-LAN or POSTSCRIPT-LAN for printer type.

At Printer

Step	Action
1.	Scroll through display options to assure TCP/IP is “ON”.
2.	Check/Configure the IP address on printer. See LAN Printer Setup section (below).
3.	The first 3 numbers of IP address must be the same for both the printer and OPFAC. Example OPFAC IP Address (internal LAN)-> 192.8.12.51 Printer IP Address-> 192.8.12.61.

At OPFAC

Step	Action
1.	Using mouse, click the center button on UNIX background and select “Access LAN Printer.”
2.	Enter the IP address of printer and hit Enter.
3.	When prompted for printer name, enter the name that will be used in AFATDS and hit Enter.
4.	Ensure that the x-term displays “Printer (name) is idle.”
5.	Hit the Enter key to close the x-term.

b. External LAN (Secondary).

At OPFAC

Step	Action
1.	Use normal printer set up procedures. System-Configuration---Printers-----Printer Services---Configuration---Add Printer
2.	Enter the printer name.
3.	Select PCL-LAN or POSTSCRIPT-LAN for printer type.

NOTE!

A LAN communications network must be present and turned on in order to use an external LAN printer.

At Printer

Step	Action
1.	Scroll through the display options to assure TCP/IP is “ON”.
2.	Configure the IP address on printer. See LAN Printer Setup section (below).
3.	The first 3 numbers of IP address must be the same for both the printer and OPFAC. Example OPFAC IP Address (external LAN) -> 192.8.13.51 Printer IP Address-> 192.8.13.__ (where __ can be 1-255).

At OPFAC

Step	Action
1.	Using mouse, click the center button on UNIX background and select “Access LAN Printer.”
2.	Enter the IP address of printer and hit Enter.
3.	When prompted for printer name, enter the name that will be used in AFATDS and hit return.
4.	Ensure that the x-term returns “Printer (name) is idle.”
5.	Hit the Enter key to close the x-term.

NOTE!

The name that you give your printer must match exactly between what you enter in the AFATDS windows for printer setup and in the Access LAN Printer routine!

If you chose printer model "Postscript_LAN" your printer must have postscript capabilities. All printers that you desire to use on a LAN must be LAN capable.

3. LAN Printer Setup.

Configure TCP/IP Parameters.

Step	Action
1.	Press MENU until EIO 1 JETTIRECT MENU is displayed.
2.	Press ITEM unit CFG NETWORK=NO* is displayed.
3.	Press - Value + until CFG NETWORK = YES is displayed.
4.	Press SELECT CFG NETWORK=YES* should be displayed.
5.	Press ITEM and verify TCP/IP=ON.
6.	Press ITEM unit CFG TCP/IP=NO* is displayed.
7.	Press-Value+ CFG TCP/IP=YES is displayed.
8.	Press SELECT CFG TCP/IP=YES* should be displayed.
9.	Press ITEM to Bootp=NO*.
10	Press ITEM to IP BYTE 1=192. (Press - Value + to set address)
11	Press ITEM to IP BYTE 2=8.
12	Press ITEM to IP BYTE 3=13.
13	Press ITEM to IP BYTE 4=155.
14	Press ITEM to SM BYTE 1=255.
15.	Press ITEM to SM BYTE 2=255.
16.	Press ITEM to SM BYTE 3=255.
17.	Press ITEM to SM BYTE 4=0.
18.	Printing Configuration Page should be displayed.
19.	SELF/TEST Configuration Printed.

B. Lightweight Laser Printer.

The Lightweight Laser Printer (LLP) is standard issue with the AN/GYK-47 (CCU-2) V1 and V2 (single workstation) configurations. Note that there is no power switch with this printer. When it is plugged in, power is applied to the printer. The LLP is capable of being configured as a parallel printer only.

1. Connect the standard CHS2 parallel printer cable to the parallel port on the CCU-2.
2. Connect the other end to the parallel port on the Lightweight Laser Printer.
3. Plug the printer into any convenience outlet. (The maximum amperage requirement for the LLP is 4.5 amp. therefore it can be plugged into the same circuit as the CCU-2.)

At OPFAC

Step	Action
1.	Use normal printer set up procedures. System-Configuration---Printers-----Printer Services---Configuration---Add Printer
2.	Enter the printer name.
3.	Select PCL-Parallel for printer type. (NOTE: The Lightweight Laser printer is NOT 'Postscript' capable.)

System Initialization
OPFAC Initialization

A. Startup Procedures. It is important to turn the computer on after its attached devices have been turned on and after the LAN has been terminated. Otherwise, the AFATDS software may not work correctly.

1. Power on devices in this order:

   UCU:

   a. UPS

   b. UPS power strip

   c. TCIM(s), Printer, and Monitor

   d. AFATDS Workstation (UCU)

   CCU-2:

   a. Printer

   b. If SPTCIM's are to be used, ensure they are inserted prior to powering up the CCU-2

   c. AFATDS Workstation (CCU-2)

2. After a series of diagnostic tests have been run, the DII COE login will be displayed.

3. Login and wait for system initialization to complete.

System Initialization
UCU /UCU-2 / CCU-2 (SUN) Software Installation

This procedure is used to load the operating system (OS), system software, and application software on a UCU, UCU-2 or CCU-2 system from a compact disk (CD).

NOTE!

It is important to have the TCIM's turned on when loading software on a UCU workstation. If a TCIM needs to be added to the workstation or turned on after power up is complete, the workstation must be shut down and restarted.

IMPORTANT!!

All passwords are initially defaulted to a common password. You must change default passwords immediately upon software installation to comply with system security requirements.

A. To load the UCU or CCU-2 workstations with Non-FDD software using the CD-ROM load.

Step	Action
1.	Power the workstation by pressing the upper right keyboard key (UCU) or by turning on the power switch (CCU-2).
2.	Insert the Non-FDD bootable AFATDS CD-ROM.
3.	When the display indicates the system is initializing, hold down the <stop> + <A> keys.
4.	When you get the white screen section with the "Type boot, go (continue), or login (command mode)" prompt, type "boot cdrom" and press <Enter>.
5.	Enter the firmware password, if prompted, and press <Enter>.
6.	Wait from 30 to 45 minutes until the workstation reboots.
7.	Enter the "New Machine Name".

Step	Action
8.	Enter the "New Machine Address".
9.	Select OK. Wait 15 seconds.
10.	Select Yes when prompted to reboot.
11.	Workstation reboots and displays the DII COE login screen.

NOTE

At this point the user may proceed to the Logging In and Starting Non-FDD AFATDS procedure or proceed with step 12 to shutdown the workstation. The CD may be ejected using the Disk utilities function if AFATDS is started.

12.	Login as sysadmin.
13.	Double-click the "System_Admin" icon on the "Applications Manager" window.
14.	Double-click the "Eject CD-ROM" icon on the "Applications Manager System Admin" window.
15.	Remove the CD-ROM and close the CD-ROM drawer.
16.	Perform the secman and sysadmin normal functions (passwords, profiles, etc.,).
17.	Select Start\Shutdown.
18.	Choose the "Shutdown the computer" option.
19.	Select OK.
20.	Select Yes on the confirmation window.
21.	Depending upon type of workstation, do one of the following: UCU: When you get the white screen section with the "Type boot, go (continue), or login (command mode)"prompt, type "power-off" and press <Enter>. Enter the firmware password and press <Enter>. CCU: Flip the power switch on the left side of the workstation to OFF.
22.	The system will power off and the monitor will go into standby mode.

B. To load the UCU or CCU-2 workstations with FDD software using the CD-ROM load.

Step	Action
1.	Power the workstation by pressing the upper right keyboard key (UCU) or by turning on the power switch (CCU-2).

Step	Action
2.	Insert the FDD bootable AFATDS CD-ROM.
3.	When the display indicates the system is initializing, hold down the <stop> + <A> keys.
4.	When you get the white screen section with the "Type boot, go (continue), or login (command mode)" prompt, type "boot cdrom" and press <Enter>.
5.	Enter the firmware password, if prompted, and press <Enter>.
6.	Wait from 30 to 45 minutes until the workstation reboots.
7.	At the "Start TOC Boot Control?" prompt, enter <n>.
8.	Enter the "New Machine Name".
9.	Enter the "New Machine Address".
10.	Select OK. Wait 15 seconds.
11.	Select Yes when prompted to reboot.

NOTE

At this point the user may proceed to step 2 of the Logging In and Starting FDD AFATDS procedure or proceed with step 12 of this procedure to shutdown the workstation. The CD may be ejected using the Disk utilities function if AFATDS is started.

12.	At the "Start TOC Boot Control?" prompt, enter <n>.
13.	Workstation displays the DII COE login screen.
14.	Login as sysadmin.
15.	Double-click the "System_Admin" icon on the "Applications Manager" window.
16.	Double-click the "Eject CD-ROM" icon on the "Applications Manager System Admin" window.
17.	Remove the CD-ROM and close the CD-ROM drawer.
18.	Perform the secman and sysadmin normal functions (passwords, profiles, etc.,).
19.	Select Start\Shutdown.
20.	Choose the "Shutdown the computer" option.
21.	Select OK.
22.	Select Yes on the confirmation window.

23.	Depending upon type of workstation, do one of the following: UCU: When you get the white screen section with the "Type boot, go (continue), or login (command mode)"prompt, type "power-off" and press the Enter key. Enter the firmware password and press <Enter>. CCU: Flip the power switch on the left side of the workstation to OFF.
24.	The system will power off and the monitor will go into standby mode.

C. Assigning Profiles. Each time a secman or sysadmin login occurs, the profiles should be checked to ensure that proper functions are available.

Step	Action
1.	Login as secman.
2.	Select Start\Settings\Set Profile.
3.	The Profile Selector window will appear. In the Selected Profiles section, SSO Default should be present. If not, select SSO Default from the Available Profiles section and press the right arrow button. Press the OK button.
4.	The Profile Selector Results window will appear. Verify that None is displayed in the Failed section. Press the Close button.
5.	Perform any required secman functions.
6.	Log out of the secman account.
7.	Login as sysadmin.
8.	Follow steps 2 - 5 except that the required profile needs to be SA Default.
9.	Log out of the sysadmin account.

D. Creating User Accounts. To comply with security requirements, each AFATDS operator should be assigned an individual user account and password.

Step	Action
1.	Login as secman.
2.	Select Start\Settings\Set Profile.
3.	The Profile Selector window will appear. In the Selected Profiles section, SSO Default should be present. If not, select SSO Default from the Available Profiles section and press the right arrow button. Press the OK button.

4.	The Profile Selector Results window will appear. Assumed profiles show in the Successful listing. Profiles that were not successful show in the Failed list. If data is correct, select Done.
5.	Select Start\Programs\CDE App Manager.
6.	The Application Manager window will appear. Double click on the DII_Apps icon.
7.	The Application Manager-DII_Apps window will appear. Double click on the SecAdm icon.
8.	The Application Manager-SecAdmin window will appear. Double click on the APM Client icon. The Account and Profile Manager window will appear.
9.	Select File\New Account.
10.	The Create Account window will appear. Select the Identification tab.
11.	Enter the following information on the Identification tab:
12.	Login: Enter a new user name. A user name must have at least six characters.
13.	Password and Confirm Password: Enter and confirm the password being assigned to the user. A password must consist of at least eight alphanumeric characters and at least one alpha and one numeric character.
14.	Full Name: Enter the user's name
15.	Template: Select "None".
16.	Home Server: Select "EACH HOST".
17.	Manage as: Select "Local"
18.	Shell: Select"/bin/csh".
19.	Default Group: Select "afatds".
20.	Select the Groups tab. Highlight the following items: Afatds, COE, ICSF, JMTK, and Other. Click on the right pointer to move them to the right hand pane.
21.	Select the Profiles tab. Select the "afatds" profile. Click on the right pointer to move it to the right hand pane.
22.	Select the Host tab. Select the hostname of your workstation. Click on the right pointer to move it to the right hand pane.
23.	Click on the SUBMIT button.
24.	The Summary Status Window will appear and display the new user information. Select "OK".
25.	Repeat steps 8-22 for each new user account you want to create.

IMPORTANT!!

To change users when AFATDS is running, AFATDS must be shutdown and logged out before the next user can log in.

Three attempts to log in to AFATDS using the wrong password will result in a user being locked out until secman unlocks your account.

E. Logging In and Starting Non-FDD AFATDS.

Step	Action
1.	Login using your assigned user account or as the predefined AFATDS user (afatds1).
2.	Select Start\Settings\Profile Manager. The Profile Selector window opens.
3.	Select a profile(s) from the Available Profiles list and >>Add as required.
4.	Select OK. Profile Selector Results window opens.
5.	If results are successful, select Done.
6.	Select "Start\AFATDS\Start AFATDS\Army, Navy or USMC". Wait about 2 minutes for the AFATDS Workstation OPFAC Name window to appear. Click OK if starting as a single workstation or fill in a name for starting as a multi-workstation. Wait until System menu and Unit Configuration window are displayed. See instructions for multi-workstation under System Initialization: Multi-Workstation Notes
7.	At the master workstation, insert an OD disk containing the OPFAC database in the OD drive.
8.	Select System\Administration\Restore Database.
9.	Select an archive device and "Restore" on the "Restore Database" window. Confirm restoration.
10.	After database is loaded, enter unit configuration information and "Activate".

F. Logging In and Starting FDD AFATDS as Server or Standalone.

Step	Action
1.	Shutdown all workstations that will comprise the OPFAC.
2.	If a workstation will become the, apply power to that station only.
3.	Enter <y> at the Start TOC Boot Control? prompt.

Step	Action
4.	When display indicates that a TOCBS server can not be contacted, type <Ctrl> +<S>.
5.	If prompted to use previous role, select <y> to use and proceed to step 13 or select <n> and proceed with step 6.
6.	Choose the top level domain and hit <Enter>.
7.	Choose the (sub) domain and hit <Enter>.
8.	Choose the (sub) domain and hit <Enter>.
9.	Choose the (sub) domain and hit <Enter>.
10.	Choose the (sub) domain and hit <Enter>.
11.	Choose the TOC within the selected domain and hit <Enter>.
12.	Choose the subnet within TOC and hit <Enter>.
13.	Choose the BFA type for this system and hit <Enter>.
14.	Choose the Planned Role for this Machine and hit <Enter>.
15.	Proceed to step 3 of Logging in and Starting FDD AFATDS as Client procedure.

G. Logging In and Starting FDD AFATDS as Client.

Step	Action
1.	Apply power to the workstation. Ensure TOC server is running if the workstation is to be a client.
2.	At the "Start TOC boot control?" prompt, enter <y> and <Enter>.
3.	Workstation displays the DII COE login screen.
4.	Enter username (ctpuser) and select OK.
5.	Enter password and select OK.
6.	OK message that COE login is complete.

NOTE

If a database is to be restored from a floppy disk, proceed to step 7. Otherwise proceed to step 13.

Step	Action
7.	Select Start\AFATDS\AFATDS Functions\Database Utilities. Database Utilities window opens.
8.	Insert disk containing the database in the floppy drive.
9.	On the Database Utilities window, enter <2> and <Enter>.
10.	Enter <y> and <Enter> to confirm database install. Database is copied to hard drive.
11.	Hit <Enter>.
12.	Enter <q> and <Enter> to eject disk and close window.
13.	Select Start\TComm. Communications Mode - Client window opens.
14.	Select Configure\Local Unit\Names\URNS\IP Networks. Local AFATDS URN and Name should appear.
15.	Select Update.
16.	Select Configure\Comm Server. Tactical Communications Manager window opens.
17	Select Load. Wait for Information window to confirm load.
18.	Select OK.
19.	Select Activate then Exit.
20.	Select Status\Subscribers\"LAN...".
21.	Verify host unit listed. Select Close.
22.	Select Start\Settings\Profile Manager. Profile Selector window opens.
23.	Verify or Add afactp profile to Selected Profiles list.
24.	Select OK. Profile Selector Results window opens.
25.	Confirm results. Select Done.
26.	Select Start\ABCS Common\Maps and Overlays\JMTK Start. System and Map windows open.

Step	Action
27.	Select Start\ABCS Common\CTP\CTP Start. OK Informational window CTP Starting. Overlay Explorer window opens.
28.	Ensure System is the active map.
29.	Select Start\AFATDS Core\Start AFATDS.
30.	OK Informational and Multistation OPFAC Name windows. Unit Configuration window opens.

NOTE

If unit data is to be restored from OD, proceed with step 31. Otherwise proceed to step 34.

31.	Insert an OD disk containing the OPFAC database in the OD drive.
32.	Select System\Administration\Restore Database
33.	Select an archive device and "Restore" on the "Restore Database" window. Confirm restoration.
34.	Enter unit data and select Activate.
35.	When Situations menu becomes enabled, select Situations\Current.
36.	Select Map\Map Mod. Map Mod Guidance window opens.
37.	Ensure Datum is WGS 84.
38.	Exit and reopen current map if datum is changed. Action any alerts received.
39.	Select Map\Display Map. Edit Overlay and SOP windows open.
40.	Select Start\ABCS Common\RTF\RTF Live Feed Start.

System Initialization
UCU / CCU-2 (SUN)
EEPROM Password

This procedure is used to change the EEPROM (firmware) password on a UCU or CCU-2 system. The firmware password prompt is displayed when an attempt is made to boot the system from any device other than the installed hard drive.

Step	Action
1.	Log in as secman.
2.	Select "Start\Programs\Security Functions\Clear EEPROM Password".
3.	An Information Message window will open displaying the following message: “The eeprom security mode and password have successfully been cleared.” OK the window.
4.	Select "Start\Programs\Security Functions\Set EEPROM Password".
5.	Enter and confirm the new password.
6.	An Information Message window will open and display the following message: “The eeprom security mode has successfully been set to ‘command’, and the password has been changed.”
7.	Log out as secman.

System Initialization
System Security Level

A. System Security Level.

1. The AFATDS application software will only operate at two security levels: UNCLASSIFIED and SECRET. AFATDS recognizes two levels of data security: UNCLASSIFIED and SECRET. SECRET classification levels with a two word descriptor (e.g. SECRET RELROK, SECRET NATO, etc.) are all treated as SECRET by AFATDS.

2. The AFATDS application software “assumes” and retains the security level of its host workstation at the time AFATDS is started. This action is irreversible and can only be reset by reloading software. If a workstation is set to SECRET, for example, and AFATDS is started, AFATDS software can no longer be activated unless the workstation security level is set to SECRET. If the workstation is set to UNCLASS and AFATDS was last run at SECRET, AFATDS will not start.

3. When AFATDS archives data to removable media (e.g. floppy disk, optical disk), it electronically labels the archived file with the workstation security level in effect when the archive was made. If the workstation was in SECRET mode, for example, AFATDS will assign a SECRET security level to the archived data. When restoring/ importing archived data, AFATDS will not allow the restore/ import unless the current workstation security level is equal to or higher than the security level of the archived data. An AFATDS database set to SECRET, for example, will not restore on a workstation with a security level setting of UNCLASSIFIED. It will restore successfully if the workstation security level is set to SECRET.

B. Changing the Workstation Security Level.

Step.	Action
1.	Log in as secman.
2.	Select "Start\Programs\Security Functions\Security Level Manager" to open "Security Level" window.
3.	Select Local.
4.	Choose the option of whether to Set Override Capability to ON or OFF.
5.	Select the Classification Level.
6.	Select File\Close
7.	A Confirm Action dialog box asking if you want to save the settings you have chosen will pop up. Click "Yes" in the dialog box.
8.	The workstation security level is changed.
9.	Log out of secman user account.

System Initialization
Segment Installer

A. UCU/CCU-2.

The operator will receive classified data segments from FSSE, Lawton, OK on a classified CDROM. The System Administrator using the Segment Installer in the sysadmin user account, a function of DII COE, will load the classified JMEMs and non-JMEMs data. To load new segments, use the following procedure.

Step	Action
1.	Exit AFATDS and log out of the AFATDS user account.
2.	Log in to the DII COE System Administrator account (sysadmin).
3.	Place the Maintenance Utilities Data segment CDROM into the drive.
4.	Select Start | Programs | Update Segments. Load Data Segments window opens and segments are loaded to hard drive.
5.	Hit <Enter> to close window.
6.	Select Start | Programs | CDE App Manager to open the Application Manager window.
7.	Double-click the DII_APPS icon to open the Application Manager DII_APPS window.
8.	Double click the SysAdm icon to open the Application Manager - SysAdm window.
9.	Double-click the Segment Installer icon to open the Installer window.
10.	A System Processing Warning window may open stating “The following sessions are active in the system:”. OK this window.
11.	Click on the Select Source button from the Installer window.
12.	On the Select Source window, select Network as the Device and Local as the Host. OK this window.
13.	Click on the Read Contents button on the Installer window. (This will list the segments from the CDROM that can be loaded.)
14.	From the Currently Installed Segments section of the Installer window, select the segments to be deinstalled. Click on the Deinstall Software button.
15.	Select Yes when prompted to verify removal of the segments.
16.	From the Select Software to Install section of the Installer window,

Step	Action
	select the segment(s) to be installed. Click on the Install button at the bottom of the window.
17.	When the new Maintenance Utilities Data segment has finished loading, exit the SOFTWARE INSTALLER.
18.	Log out of the System Administrator account (select Start | Log-off on the lower menu bar).
19.	Log in to the AFATDS user account and re-start AFATDS.

System Initialization
Multi-Workstation Notes

A. Setup. A multi-workstation OPFAC is created when two (2) to eight (8) workstations are joined together via the primary, or internal LAN. (See paragraph F of “Hardware Configuration: Common OPFAC Configuration”.)

NOTE

All workstations in a multi-workstation OPFAC must have the same security level assigned in order to become part of the OPFAC.

B. Initialization.

Step	Action
1.	Shutdown all workstations that will comprise the OPFAC.
2.	Apply power at each of these workstations.
3.	Log in to DII COE login screen as appropriate user (e.g., afatds1).
4.	Select "OK" on "Informational Message" to acknowledge COE processing complete.
5.	Select Start\AFATDS\Start AFATDS on the workstation that will be the master.
6.	Select "OK" on "Informational Message" to acknowledge AFATDS start.
7.	In a few minutes the “AFATDS Multiworkstation OPFAC Name” window will appear.
8.	Enter the OPFAC name. (NOTE: For OPFAC name enter 16 alphanumeric characters or less. Spaces do not count toward the total count. Do not use any special characters.)
9.	Click on the “OK” button. The Master workstation will proceed to display the Unit Configuration window.
10.	Perform steps 5 thru 9 for the slave workstations.
11.	Any subsequent workstation that enters the “**EXACT**” same name at the “AFATDS Multiworkstation OPFAC Name” window will automatically join the Master workstation’s OPFAC. Workstations will be added as removable workstations if started after activation.

Step	Action
12	Select the Unit ID and Unit Role and “Activate.” at the master workstation.

C. Communications.

In a multi-workstation OPFAC, all the workstations can use any workstation’s TCIMs and LANs in order to communicate with other OPFACs. When setting up communications, networks can be assigned to any available channel on any workstation. This can be done from any workstation, with Communications Administration privileges, and any workstation can transmit data via a channel on any other workstation.

D. Assignments.

Assignments are selections that can be made which give you, the operator, specific monitoring duties that can only be done at one workstation at a time. Alerts, which have to do with the specific area, will be sent to the workstation which has selected the assignment.

The four assignments are as follows:

System Administration: Allows access to unit administration functions (i.e., backing up and restoring databases, the Master Unit List, workstation shutdown, etc.) and allows that user to receive alerts having to do with the hardware setup.

Communications Administration: Allows access to communication administration functions (i.e., network setup/delete, network on/off, etc.) and allows that user to receive alerts having to do with communications problems.

Mission Toolbar: Allows access to certain mission processing functions (i.e., mission toolbar, intervention rules, etc.) and alerts having to do with mission processing.

Message Monitor: Allows access to certain message creating and handling functions and provides alerts having to do with transmitted and received data such as plans.

E. To see if an assignment is at your workstation.

In a single workstation OPFAC, every assignment is always available because all assignments are assigned to that one workstation. In a multi-workstation OPFAC, an assignment can only be used at one workstation at a time. To see if an assignment is at your workstation, select the System menu option on the AFATDS menu bar and choose Assignments. An assignment is at your workstation if it is grayed out (this means it is already selected).

F. To obtain an assignment that is not at the workstation.

Select the System menu option on the AFATDS menu bar and choose Assignments, then the assignment you wish to acquire. A confirmation will be given asking if you really want to do it. After answering positive, an alert will be presented at the workstation that currently has the assignment so that operator knows he is losing the assignment.

IMPORTANT!!

All alerts having to do with an assignment will remain at the workstation they were originally posted at when an assignment is moved to another workstation. New alerts will go to the workstation that has that assignment.

G. Removable Workstations.

In a multi-workstation OPFAC, it is important to have the ability to be able to shut some workstations down without affecting the others. In order for this to happen, the workstations must be removable. When a workstation is added to the OPFAC it is added as a removable workstation. It will remain a removable workstation whether that workstation has assignments or not.

Workstations are added to an OPFAC by simply connecting them to the LAN, with appropriate IP address, and entering the EXACT name of the Master workstation in the "AFATDS Workstation OPFAC Name" window at start up. Removable workstations are removed from the OPFAC by shutting them down from the System Administration workstation and then disconnecting them from the LAN. Connecting or disconnecting a removable workstation requires that the LAN be re-established using the procedures in Local Area Network (LAN), Hardware Configuration: Common OPFAC Configuration.

WARNING!!

In a multi-workstation OPFAC environment, if the operator intends to add a workstation, the OPFAC must be activated from the original master workstation. If activated from the added workstation, the multi-workstations' database will be that of the added workstation and not that of the original master workstation.

System Initialization
Shutdown Procedures

The following is used to shutdown a workstation(s). Shutdown is performed from the master workstation in a multi-workstation OPFAC.

Step	Action
1.	Select AFATDS System\Exit menu option from top menu bar.
2.	Click on the “Exit” button at bottom of the Shutdown window.
3.	Select Exit to confirm shutdown.
4.	Wait for AFATDS to shutdown. (Give the system a few minutes to fully shutdown AFATDS before shutting down the workstation or rebooting the workstation.)

NOTE

Perform steps 5 through 9 if shutting down a FDD workstation only.

5.	OK the Informational message "Overlay Provider Closed.
6.	Select Start\ABCS Common\CTP\CTP Stop. Wait for Overlay Explorer window to close.
7.	Select Start\ABCS Common\Maps and Overlays\JMTK Stop.
8.	Select File\Exit on the Communications Mode window.
9.	Select File\Exit on Messaging Main Menu window.
10.	Select Start\Log-Off. The COE Log in window will appear.
11.	Log-on as "sysadmin".
12.	Choose Start\Shutdown.
13.	Choose the "Shutdown the computer" option.
14.	Select OK.
15.	Select Yes on the confirmation window.

16.	Depending upon type of workstation, do one of the following: UCU: When you get the white screen section with the "Type boot, go (continue), or login (command mode)"prompt, type "power-off" and press the Enter key. Enter the firmware password and press the Enter key. CCU: Flip the power switch on the left side of the workstation to OFF.
17.	The system will power off and the monitor will go into standby mode.
18.	Turn off power on external TCIMs

System Initialization
AFATDS Initialization

A. <u>AFATDS Initialization</u>. Selecting Start AFATDS will open the Unit Configuration window to allow the OPFAC's unit ID and unit role to configured and activated. After the unit has been activated, the unit ID and unit role cannot be changed until the next startup.

> **WARNING!!**
>
> **Changing the Unit ID from that of the last startup will cause the database to revert to the default database upon activation.**

1. When the Unit Configuration window appears, the unit ID and role of the last startup will be shown along with the workstations present on the LAN. The TCIM (SPTCIM in the case of the CCU-2) status of each workstation will also be displayed.

2. Ensure that the Unit ID and Unit Role are set correctly, and if not, set them correctly. If changing the Unit ID, please note the warning above. Ensure that the correct number of workstations and devices connected to each workstation appear. If not, determine why (e.g. not powered on, not connected, bad device or cable) and attempt to correct the problem. Remember not to disconnect SCSI cables or change SCSI addresses while the equipment is powered on: this includes the TCIM(s). Selection of the "Options | Refresh" menu item will allow the window to be updated with the latest information.

3. If a database needs to be restored, do so at this time. It is best to close the Unit Configuration window while doing this. It can be reopened by selecting "System | Configuration | Unit".

4. Set system time. Minor changes in system time (less than 5 minutes) can be made after the system is fully operational. If there is a gross difference between the system time and actual time, you must reset the system time before activating AFATDS. This can be done before or after restoring a database.

a. System => Administration => Set Times

b. Enter new synchronization time.

c. Select ‘synchronize’ (if there is a significant i.e. > 5 minutes difference between sync time and current system time, a confirmation window will appear. Select ‘OK’ on this window.

d. Wait for status bar display and time setting on window to update.

e. Select ‘OK’ to close window.

CAUTION!!

Do not attempt to set a system time earlier than the year 1992 on any AFATDS platform. Times earlier than this will violate software license constraints and corrupt the database.

5. Set local time. The local time defaults to the Zulu time zone. Setting the local time can be done at the same time you are setting the system time without exiting the Set Times windows.

   a. System => Administration => Set Times

   b. Enter new local time zone in the Local Zone field.

   c. Select ‘Set Zone’.

   d. Wait for status bar display and time setting on window to update.

   e. Select ‘OK’ to close window.

6. Once all information appears correctly, select the "Activate" button. This will lock-in the displayed configuration.

System Initialization
User Account Privileges

A user account is a set of privileges and a password assigned to a particular person. That person types in his user name and password when logging in to AFATDS; the computer will then determine what privileges that user has and apply them accordingly.

AFATDS allows a System Administrator to create and maintain user groups. A user group is a pre-established set of user privileges that can be used to establish user account privileges. Create the user groups you need before assigning user privileges; although they can be created at any time, it simplifies the process of assigning user privileges. AFATDS will allow you to assign user groups -- not individual privileges -- to the user account at any time. It will also allow you to set and reset the password as you need.

NOTE!

You cannot change the access privileges of a user who is logged onto the system.

NOTE!

It is no longer possible to create new user accounts nor to delete user accounts in AFATDS.

A. To Create a New User Group.

No.	Action
1.	Select "System | Administration | User Groups". The User Groups window will open. All users groups will be shown in the list. By selecting a user group, you may view the privilege(s) associated with the group.
2.	Select "Options | New". The User Group Edit window will open.

No.	Action
3.	Enter a name for the user group in the User Group field.
4.	Select a privilege(s) to associate with the group by checking the box next to the privilege(s) you desire.
5.	Select the OK button to close the User Group Edit window.
6.	Repeat with step 2 to create another user group, otherwise continue with the next step.
7.	Select the OK button to close the User Groups window.

B. To Assign User Privileges.

No.	Action
1.	Select "System | Administration | Users".
2.	The Select User window will appear. Select a user and then select "Options | Edit".
3.	The User Account window will appear. Select the User(s) for the privileges you want to assign to the selected user.
4.	Select OK to close the User Account window and to implement the assignment of the new user privileges.

System Initialization
Master Unit List Notes

WARNING!

Any modifications to the Master Unit List should be avoided if possible.

If modifications are necessary, this section must be read prior to making modifications and/or deletions.

When in the current or planning situation, modifying a Unit ID on the Master Unit List(MUL) requires that the map must be closed (hidden) and/or the operator must exit the situation before the change to the Basic Unit Info window will take place.

WARNING!

A MUL or JMUL should not be imported into AFATDS if it contains deletions or changes to the existing MUL/JMUL. This can result in corrupting the existing database. In this case, the recommended procedure is to start fresh with a blank database and then import the MUL/JMUL.

AFATDS uses a Master Unit List to store all Unit IDs which can be used for Unit Status and Communications. For each Unit ID, the Master Unit List stores a Unit Number, a Unit Identification Code (UIC), a System Type (for example AFATDS, BCS, FIST DMD, ATHS, etc.) and optional Aliases. In AFATDS, data is stored by Unit Number instead of Unit ID. This allows OPFACs to exchange Unit data correctly without requiring Unit IDs to be displayed exactly alike at both OPFACs. On the other hand, it REQUIRES Unit Numbers to be the same between ALL AFATDS OPFACs which will exchange Unit data.

Table 6. Sample of Master Unit List

Unit ID	Unit #	System Type	TACFIRE Alias
OPS 1-37 FA	616	AFATDS	O/P/S/1/37
1 BCS A 1-37 FA	603	BCS	B/1/A/1/37
A 63 FA	640	AFATDS	//A//63
1 FDS A 63 FA	642	MLRS/LANCE	/1/A/1/63
FSE 3 Bde	500	AFATDS	F/S/E/3C/BDE

A. Unit IDs.

Each unit in AFATDS is assigned a Unit ID. The Unit ID is displayed on windows and printed out on reports. It is entered in the Master Unit List as six separate fields but is shown as one 33-character word on windows and print outs. The fields in the Unit ID are meant to be echelon fields but you can enter anything in them you need. Figure 19 shows the echelon and the number of characters in each field.

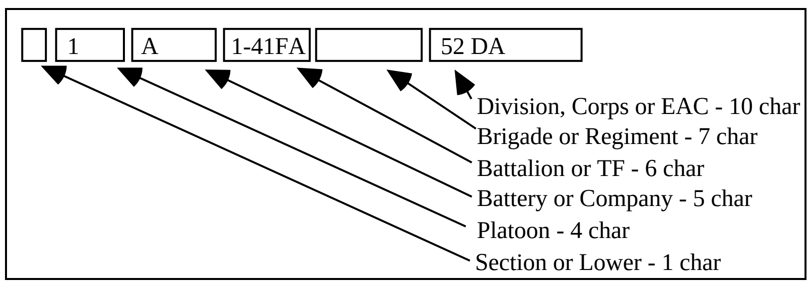


Figure 19. Unit ID Fields

Unit IDs are not sent to other systems. Between AFATDS systems, the unit number (see below) is used to describe what unit is being updated. For non-AFATDS systems (e.g. TACFIRE, BCS, ABCS, etc.), an ALIAS is entered into the Master Unit List which must be the same as what the other system has as its unit ID (or subscriber ID).

B. Unit Numbers.

AFATDS uses unit numbers to store and exchange data. If Unit X sends Unit Y data about OPS 1-37 FA, it sends data for unit number 616 (see

Table 6). If at Unit Y, unit number 616 was 1 CAV DIVARTY then there would be a mix-up of the data. Or, if at Unit Y, there was no unit number 616, then there would be no unit for the update. This is why it is extremely important for unit numbers to be the same between AFATDS OPFACs.

IMPORTANT!!

Unit Numbers must be the same between AFATDS OPFACs for data distribution, communications and unit status updates to work correctly. This requires a unit at Division or Corps level to maintain a common Master Unit List as well as any updates or changes to the Master Unit List.

When a unit is created in the Current situation, it is stored by a unit number instead of a unit ID. With the above example, if A/21 FAM is created in Current with unit number 1001 and then the unit in the Master Unit List is deleted, then this unit suddenly has no Unit ID to view. It will be shown on a screen as “Unknown Unit”. It can still be viewed on the map because when the symbol was entered by the operator, the function and lower and higher echelon IDs were entered. This means that if a unit does show up as “Unknown Unit ID”, it can be found on the map with the Find Symbol window and deleted by using the map popup.

C. <u>Device Type</u>.

AFATDS decides what format to put messages in when they are to be sent out and what format to decipher messages when they are received. This is done based on the System Type of the Unit we are talking to. Therefore, it is very important to have the proper system type specified for the unit. If the only way to talk to another unit is to set it to a wrong, but similar, system type, something more serious is wrong either with the device or with AFATDS.

D. <u>Unit Aliases</u>.

Last, AFATDS uses the unit number to identify units. Whenever it displays them on the screen it uses the Unit ID. Other systems use different methods: TACFIRE systems (IFSAS, BCS, FDS, FED, etc.) uses a subscriber ID like "B/1/A/2 /82", EPLRS uses a MILID like "FS1-79-2", etc. When another system sends AFATDS a message, AFATDS must "translate" their unit ID into an AFATDS unit number and unit ID. This is done by using "aliases". The aliases for a unit are entered in the Master Unit List and include the following: Default MSE Phone Number, EPLRS MILID, TACFIRE Alias, NATO Alias, MTS Call Sign, and ATCCS Alias.

For an example, suppose that the TACFIRE alias for unit "1BCS A 2-82 FA" (unit number 17) is "B/1/A/2 /82 ". If a TACFIRE device (e.g., BCS) sends us a message about "B/1/A/2 /82 ", AFATDS will look that up in the Master Unit List, find unit number 17, and know the message is about the unit "1BCS A 2-82 FA". If the TACFIRE device would have instead sent us a wrong subscriber ID, like " /B/1/A /282", AFATDS would have looked in the Master Unit list and not found a matching Alias and could not have actioned the message. This illustrates the importance of having correct alias data entered in the Master Unit List.

IMPORTANT!!

All units talking to non-AFATDS systems must have the correct alias entered. The AFATDS OPFACs which talk to these units must have the correct Alias entered as well.

As a rule: any unit ID alias entered in a non-AFATDS device must have the same setting in the AFATDS Master Unit List.

E. Finding Units on the Master Unit List.

The Master Unit List can be sorted (filtered) in several ways that will help the operator to find specific units or types of units. This is extremely useful when the number of units on the list is in the thousands. The list may be filtered by any combination of the following:

1. Master Unit List Number (To - From)
2. System Type(s)
3. Unit ID (Filters out units whose name does not contain the text you identify in each field of the unit name. If you leave the asterisk (*) in a field, then that field will not be considered in the filter.)

These Master Unit list filtering features may be used while performing any of the functions that present the Master Unit list as the list to select from (Communications Configurations, New Units etc...). It is important to note that if the Master unit list has been filtered, the list will be presented with the filter applied anytime it is accessed.

System Initialization
Database Backup/Restore

Databases in AFATDS can be backed up to magnetic media (optical disk, Jaz disk, or floppy disk). Periodic backup of databases is highly recommended as a method to protect yourself should your database become corrupt. Each type of media is capable of storing only one database at a time so care should be taken when backing up your database. Backing up to a disk that already has a copy of a database will overwrite the data on that disk.

Databases can only be restored before activating the Unit Configuration. When a database is restored, the OPFAC now has the Unit ID of the unit that backed up the restored database. If the operator desires to change the Unit ID of the OPFAC, the procedures in paragraph A.5 must be followed.

For the UCU/CCU-2 platforms, databases restored from Optical disks, Jaz disks, or floppy disks (for databases made using the current version of AFATDS) must be restored after AFATDS is running, but prior to "Activating" the workstation from the Unit Configuration Window. If a legacy database (made using an AFATDS 98 version or early build of AFATDS 99 software) is to be restored from a floppy disk, then it must be restored after logging in to the proper COE user group, but prior to starting AFATDS. The AFATDS Functions' Database Utilities must be used to restore a legacy database from a floppy disk, see paragraph A.6. You should backup your database periodically so it can be restored if your OPFAC crashes or becomes degraded.

In addition, special utilities are available in AFATDS to initialize, format, and eject archive disks.

IMPORTANT!!

Optical disks and Jaz disks that will be used with the UCU/CCU-2 (SUN) platform must be "Initialized" before they can be used. If required they may also be "Formatted" before being "Initialized". No special preparation is required for floppy disks.

A. Backup/Restore on the UCU/CCU-2 (SUN) platforms.

1. Optical and Jaz Disk Initialization. Most optical and Jaz disks come pre-formatted and only need “Initializing”. Initializing formats the disk with the proper information to allow AFATDS to use it for backing up and exporting data.

No.	Action
1.	Insert disk into archive disk drive.
2.	Select “System | Disk Utilities...”.
3.	Select Media Device type of Optical/Jaz Disk.
4.	Select "Initialize..." and then select "Apply" for the UCU/CCU-2.
5.	If initialization fails, the disk must be formatted (see A.2).
6.	Confirm the operation on the confirmation window. The Disk Utilities window will become grayed out.
7.	When completed, the Disk Utilities window will be enabled again. The disk may be ejected by selecting “Eject” and then "Apply" or may be left in the drive.

2. Optical and Jaz Disk Formatting. Using the Format command under the Disk Utilities window will completely reformat the disk. This can be used on either platform to attempt to repair a disk that has been damaged or is unreadable.

IMPORTANT!!

Note that in EXTREME circumstances an optical disk may be CAREFULLY taken apart, cleaned, air dried and reassembled. This should ONLY be done as a last resort as the disk could easily be damaged.

No.	Action
1.	Insert disk into archive disk drive.
2.	Select “System | Disk Utilities...”.
3.	Select Media Device type of Optical/Jaz Disk.
4.	Select “Format...".

No.	Action
5.	Confirm the operation on the confirmation window. The Disk Utilities window will become grayed out.
6.	When completed, the Disk Utilities window will be enabled again. The disk may be ejected by selecting “Eject” and then "Apply" or may be left in the drive.

3. Database Backup. Backing up databases archives them to a disk so they can later be restored.

No.	Action
1.	Insert disk into archive disk drive.
2.	Select “System | Administration | Backup Database”.
3.	If automatic archive of database is desired, select Auto Archive - enable, and enter the desired time interval in the interval window. This will cause a database backup to be automatically initiated at the specified time interval.
4.	On the Backup Database window, select the disk and then click on “Backup...”. Note: If a manual backup of a database is performed, it will turn off any previously set 'Auto Archive'.
5.	Confirm the operation on the confirmation window.
6.	The window will disappear when the backup operation is complete.
7.	The disk may be ejected by selecting “System | Disk Utilities...” and selecting "Eject ” and the "Apply" button.

4. Restore Database. Restoring databases copies them from an archive device and places them in the computer so they may be used. The databases must have been backed up as shown in paragraph A.3.

No.	Action
1.	Insert disk into archive disk drive.
2.	Select “System | Administration | Restore Databases”.
3.	On the Restore Databases window, select the disk and then click on “Restore...”.
4.	Confirm the operation on the confirmation window.

No.	Action
5.	The window will disappear when the restore operation is complete.
6.	The disk may be ejected by selecting “System | Disk Utilities...” and selecting "Eject ” and the "Apply" button.

NOTE!

If a manual backup of a database is preformed, it will turn off any previously set "Auto Archive".

5. Changing your Unit ID after restoring a database.

After restoring a database the unit ID for the workstation may be changed. This will cause the current active database (database just restored) to be replaced with the default database. This will result in the loss of all tactical data in the restored database. To avoid this, copy the current active database to the default database prior to changing the workstation unit ID. This must be done before activation of the AFATDS software. This will result in the restored database becoming the current active database for the changed unit.

No.	Action
1.	Select Start | AFATDS | AFATDS Functions | Database Utilities.
2.	Enter "6" for the Database Utilities option "Change the Default Unit ID in AFATDS" and press the "Enter" key.
3.	The operator is notified "This function will make the current active database the default database. Whenever a Unit ID or Unit Role is selected from the unit Configuration window, this new default database will be used. Enter "Y" and press the "Enter" key.
4.	When the database replacement is confirmed, press the Enter key and return to the Main Menu.
5.	and press Enter to quit Disk Utilities.
6.	Activate AFATDS using the new Unit ID.

6. Restore a Legacy Database using the Floppy Database Utilities.

No.	Action
1.	Select Start | AFATDS | AFATDS Functions | Database Utilities.
2.	Place a 3 1/2 " Floppy disk containing the database you wish to restore into the floppy drive.
3.	Enter "1" for the Database Utilities option "Restore Active database FROM floppy disk" and press the "Enter" key.
4.	Observe that the active database will be overwritten if you continue. Enter "Y" and press the "Enter" key.
5.	Observe the restore database process.
6.	You will be given a prompt "Database Restore has completed".
7.	Press the Enter key and return to the Main Menu.
8.	If the operator desires to change the Unit ID of a workstation that has had a database restored from a floppy, it may be changed in the same way as described in paragraph A.5 above.
9.	Enter "5" for Floppy Disk Utility Menu option "Eject Floppy" or enter "q" and press Enter to quit Disk Utilities and to eject the floppy disk.
10	Start AFATDS.

B. Special Considerations. Each database contains a combination of common information (Master Unit List, Geometry, Basic Unit Data etc...) and data that is tailored to the individual OPFAC (Communication structures, Data Distribution structures, Guidance etc...). The issue of Master Unit List commonality has to be resolved at the highest possible level to ensure that each unit is given a unique designator. Master Unit Lists can be Archived at any time regardless of the classification of the OPFAC. However, a Master Unit List can only be Imported if its classification is less than or equal to the classification of the OPFAC. It is important to realize though, that a Master Unit List Import will not append to your existing list, it will replace the existing list with the list that is being imported. Extreme care should be taken when importing a Master Unit List to ensure that any units that are in the current situation or in any fire support plans are represented by the same Master Unit List number that they originally had.

System Initialization
Opening an Xterm

An Xterm window gives the user a means to enter UNIX commands. The sysadmin user is the only user that has the ability to open an Xterm.

1.	Login as sysadmin.
2.	Select Start \ Programs \ CDE Application Manager.
3.	Double-click on the DII_APPS folder in the Application Manager window.
4.	Double-click on the SysAdm folder in the Application Manager - DII_APPS window.
5.	Double-click on the Xterm icon in the Application Manager - Sys Adm window.
6.	Login as sysadmin at the Xterm login prompt and press [Enter].
7.	Enter the sysadmin password and press [Enter].
8.	To close the Xterm, type exit and press [Enter].

System Initialization
Map Notes

For the Current Map and each of the Planning maps, several settings must be provided so that grid coordinates can be entered correctly and the map will be displayed correctly.

A. Map Mod.

The Map Mod is a 100 km square area in which all grids entered by the operator or received from a non-AFATDS device in short form (e.g. 2500 5000 will be converted to long coordinates) (see below). The map mod is specified by entering either the upper-right, lower-left or the center of the area.

Setting the Map Mod

No.	Action
1.	Select the "Map | Map Mod" menu item on a map window
2.	The Map Mod Guidance window will appear. Choose lower-left, upper-right, or center.
3.	Enter the UTM grid for the chosen reference point of the Map Mod.
4.	Select the Map datum.
5.	Select OK to close the window.
6.	If you select a new datum, a High Level Alert message will be generated.
7.	The alert will give you the following instructions: "Exit plan and reopen to have Map Mod change take effect".
8.	Delete the alert. Exit Current (or, if applicable, the Plan) by selecting Mission Processing | Exit Current... (or Planning | Exit Plan...). When prompted for a confirmation, select EXIT.
9.	Reopen Current (or Plan) by selecting Situations | Current (or Situations | Open Plan).

Note that the map mod will default to “Lower Left” each time the window is opened. the Map Mod coordinates entered will reflect the "Lower Left" corner of the Map Mod.

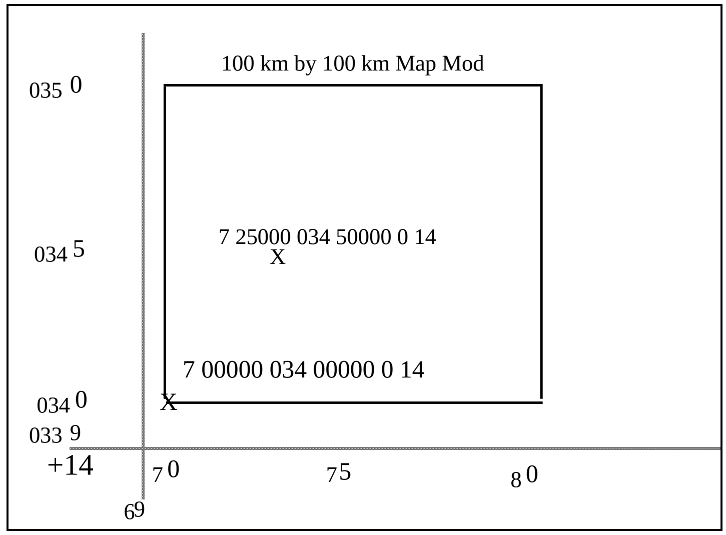


Figure 20. Map Mod in AFATDS is 100 km. by 100 km.

In Figure 20, the AFATDS operator has entered 7 00000 034 00000 0 14 as the Lower Left coordinates of the Map Mod. If an observer sends a fire mission using an Easting of 2500 and a Northing of 5000, AFATDS will convert these short coordinates into 7 25000 034 50000 0 14 on this Map Mod.

B. <u>Datum</u>.

The Datum setting allows you to enter which Datum and Spheroid will be used when entering and displaying grid coordinates on windows and when viewing locations on the map. By selecting the "Map | Map Mod" item on a map window menu, the "Map Mod Guidance" window will be opened which allows setting this value. Set the value to the datum of the paper map you are using to obtain grid coordinates.

IMPORTANT!!

In order to have a change to the datum take effect, you must exit Current or Plan-Phase and then reopen Current or Plan-Phase.

The datum which you will use at your OPFAC is not necessarily the datum other units or devices are using. For each NON-AFATDS unit, you may set the datum which they will use when sending you grids. In fact, every non-AFATDS unit MUST have a Datum specified. To set this datum for non-AFATDS units, you must edit the unit and on its Basic Unit Information window, set the Datum to the appropriate value. ABCS units (ASAS, CSSCS, MCS, FAADC2) must have a DATUM of WGS 84 specified in their Basic Unit Data since that is the only DATUM that those systems are currently capable of working in. Failure to make this entry may cause incorrect locations to be received from ABCS units. Datums for units are ignored by AFATDS. This is because JMCIS always sends coordinates in the WGS 84 datum.

C. Map Setup.

The initial Map Center location, Map Scale and the Overlays which appear when a map is first opened can be set by editing the Map Setup. This is done by selecting "Map | Map Setup | In Use" from a map's menu bar. The Map Setup window determines the settings the map will default to when the map window is first opened. Changing entries on this window while a map is open will not affect the current map display; the new values will be used the NEXT time the map is opened.

D. Setting the Map View.

1. To center the map on an exact location, select "Center Map" from the "Map" menu. On the "Center on Grid" window, enter the desired location into the location fields. Then press "OK" to center the map on the desired location while closing the "Center on Grid" window.
2. To establish the current map view as a "name" view, on the AFATDS map, select File | Save Map Area. The Save As window will open. Enter a name in the Selection field and select the OK button. The name of the saved map area will now appear in the Recall Map area pull down.
3. To return the current map view to a previously established "name" view, select "Recall Map Area (at the bottom left of the map) and the view name from the pull down.

NOTE!

Map name views are only available on the chart tab on which they are created and on new chart tabs created after the name view is created.

E. Displaying/Hiding the Map Symbols.

When a map window (e.g. Current) is first opened, no map symbols are shown. This allows work to be done without the increased load of a map to interfere.

1. To show the map symbols, select the "Map | Display Map" menu item.
2. To hide the map symbols, select "Map | Hide Map".
3. Turn on the overlays you are interested in viewing.

F. Overlays .

The Overlays used on the map do not actually contain the symbols and the information you see. Instead they are only filters which allow you to specify WHAT KIND of symbols you wish to view. For example, you can specify to see general KINDS of symbols:

Fire Support Targets with Target Numbers AA0001 to AA9999
Enemy Cannon Units
Friendly FSCM and Battle Area Geometries

But you cannot specify to see specific symbols themselves:

All units subordinate to 2-82 FA
Geometries TAI Platinum, PL Mike and NFA Golddust

Setting Overlays for your Map

No.	Action
1.	Select "Map | Overlays | In Use"
2.	The Overlay Settings window will appear
3.	If you wish to edit any overlay listed, select the EDIT button.
4.	The Overlay window will appear. Select the category you wish to modify. Select the criteria data corresponding to that category. Repeat with a different category (i.e., Friendly Units, Enemy Units, Geometries) if necessary. One overlay may contain criteria data in different categories.
5.	To specify which situation (Current or a plan-phase) to obtain symbols from, click on "Current Situation" or "Situation in View" or add one or more plans to the "Planned Situation" list. Avoid using "Current Situation" option unless you are in a plan-phase and wish to have current situation symbols displayed while you are viewing the plan map.

No.	Action
6.	If "Situation in View" is selected, this will cause the symbols to be taken from the situation of the map currently being viewed. For example, if you are looking at the Current map, the symbols will be taken from Current. If you are looking at the Plan Blue, Phase 2, the symbols will be taken from that plan-phase.
7.	If you want to see SCPs, when this overlay is on, select the "SCPs" check box.
8.	If you want to see Route Segments, select the "Route Segments" check box.
9.	If you want to see Target Indicators when this overlay is on, then select the "Target Indicators" check box.
10.	Select OK to save the changes or CANCEL to ignore the changes.
11.	The Overlay Settings window will reappear. Select the overlays you wish to appear on the map. Select "Apply" or "OK" to update the map.

G. Cursor Location.

The coordinate location of the cursor is displayed in the left bottom corner of the AFATDS map.

H. Copying Specifying Grid Coordinates from the Map.

A UTM grid may be specified by clicking on the map itself.

1. Position the cursor at the desired map location.
2. Hold the <Ctrl> key and click the RIGHT trackball button.
3. Position the cursor anywhere on a UTM grid field inside a window.
4. Hold the <Ctrl> key and click the MIDDLE trackball button.

I. Grid Zone Switching.

Grid Zones are slices of the earth that are numbered from 1 to 60 (north of the equator) and -1 to -60 (south of the equator). Because grid zones angle in to meet at the North and South Poles, a map sheet in one grid zone may show another grid zone line at an angle (see below). For this reason, when scrolling the map, it is necessary to redraw the map at a new angle to maintain accuracy when the edge of a grid zone is reached or when you've scrolled far to the North or the South.

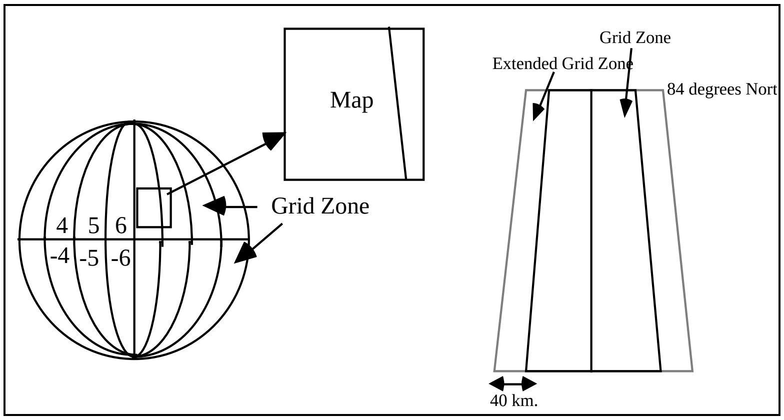


Figure 21. Grid Zones

In AFATDS, the map can be scrolled between 84 degrees North (Latitude) and 80 degrees South. Each grid zone has a 40 km. extension in which you can scroll before being forced to "switch" grid zones. In addition, every 800 km. or so scrolling North and South you will be forced to switch grid zones in order to draw the map at a slightly different azimuth. As you can see, since a grid zone extends 40 km. into each adjacent zone, a grid coordinate lying near the edge of a given zone can be expressed in terms of two different grid zones; therefore, two different UTMs can be used to designate the same spot on the ground.

When the edge of one of these areas is reached, the map grid lines will not display anymore and the map will not scroll anymore. This is a signal to switch grid zones in the proper direction. When this happens select "Map | Change Grid Zone | North, South, East or West" appropriately.

J. Filters.

The Filters menu under the map menu allows you to

1. Hide and Show range fans (i.e. arcs) of selected units
2. Hide and Show labels of selected units, geometries and targets
3. Hide selected symbols
4. Show all hidden symbols.

To use the Filters, simply select the symbols you desire and then select the appropriate Filters option. To show any previously hidden symbols, select Show Hidden Symbols.

K. Map Keyboard Trackball Options.

The trackball can be used to manipulate and select symbols on the map. It can be used to drag, select, edit and get information about symbols as well as scroll the map and get grid coordinate data from the map.

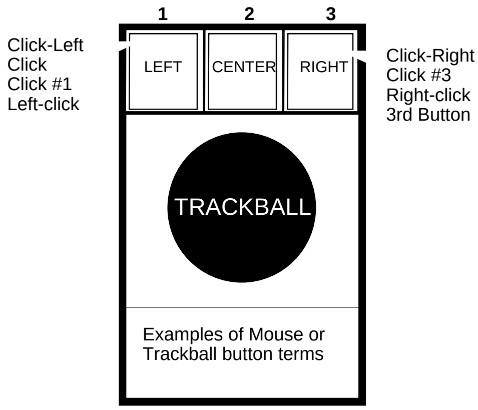


Figure 22. Examples of Mouse or Trackball Button Terms

To scroll the map.

1. Position the cursor anywhere in the PAN window, then left click in the PAN area, the PAN window will center on the cursor.
2. The PAN window can also be positioned by dragging with the left-trackball button.

To select a symbol on the map.

1. Position the cursor on the symbol and click the LEFT trackball button.
2. It may be easier to select some geometries by positioning the cursor on its name. It may be easier to select headquarters symbols by positioning the cursor on the staff which drops down from the symbol.

To select multiple symbols.

1. Select the first symbol as shown above. For each additional symbol hold the <SHIFT> key and click the LEFT trackball button.
2. To unselect a symbol without unselecting the other symbols, position the cursor on the symbol you wish to unselect. Hold down the <SHIFT> key and click the LEFT trackball button.

To “lasso” multiple symbols.

1. Position the cursor just outside the group of symbols you wish to select. Press the LEFT trackball button and drag the trackball until a rectangular outline encloses each of these symbols.
2. Let go of the trackball button. Each symbol within that outline is now selected.

To drag a unit(s).

1. Select the unit(s) as shown above.
2. Press the MIDDLE trackball button and drag the unit(s). If more than one unit has been selected, they will drag together as a group. Release the trackball button when the desired location has been reached.

To get information from a symbol on the map (popup menus).

1. Select a symbol as shown above. (Only one symbol can be selected for this to work).
2. Click the RIGHT trackball button from anywhere on the map.
3. A pop-up menu will appear. Select the desired option from the menu.

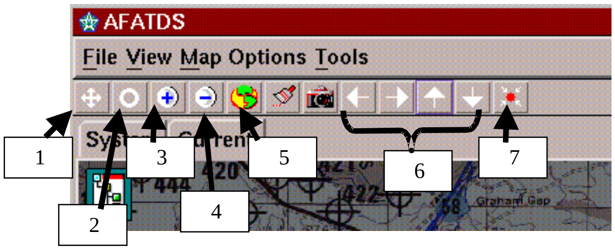
To drag a geometry.

1. Open a pop-up menu as shown above for a geometry.
2. Select the EDIT option from the menu.
3. When the Edit Geometry window opens, select COORDINATES.
4. While the coordinates window is open you may drag the geometry by clicking on the blue dot on it with the LEFT or MIDDLE trackball button. You may drag a point on the geometry by clicking on a gray dot on it with the LEFT trackball button. Do not select a gray dot with the MIDDLE trackball button as this will cause that point on the geometry to disappear.

To select a Route Segment

When adding or deleting a Route Segment to/from a general Route or Unit Move Route a special keyboard-mouse click combination is required: <SHIFT>+<ALT> and click the LEFT trackball button. No paste is necessary, this combination will automatically select and add or deselect and remove the Route Segment to/from the list for that Route or Unit Move. The selected Segment symbol will change in highlight. Selection or deselection in this manner does not otherwise affect the symbol or its underlying data (e.g., deletion from the list of segments in a Route does not delete the segment or its map symbol, it only removes the segment reference on that list).

L. AFATDS Map Tool Bar.



Index	Tool	Use
1.	Zoom icon	When selected, changes map cursor to a 4-pointed arrow. Used to change map scale by zooming in. To use, click icon and move cursor to center of desired map area. Click and hold left trackball key and drag. Two boxes are created. The inner box represents the map view after zooming in. The outer box represents the area that will show in the lower right corner inset map. Release the left trackball key when the desired area is within the drag box. The map zooms to scale and the cursor changes back to a pointer
2.	Re-center icon	When selected, changes map cursor to a hollow circle. Used to re-center the map. To use, click icon and move cursor to center of desired map area. Left click the trackball. The map centers on the cursor and the cursor changes back to a pointer.
3.	Zoom in icon	Used to scale the map. To use, click icon. The map scales to ½ the last viewed scale (e.g., if the map is at 1:50000, clicking the icon changes the scale to 1:25000).
4.	Zoom out icon	Used to scale the map. To use, click icon. The map scales to 2 –times the last viewed scale (e.g., if the map is at 1:50000, clicking the icon changes the scale to 1:100000).
5.	Whole World icon	Used to display world map. To use, click icon. Map displays the entire world. Note: If map products (CARDG, etc) are loaded and displayed the world map will display as a black background if maps are not loaded for the entire world. If this occurs, click Map Options, Map

		Types, WVS Vector Map. This action displays the default World Vector Shoreline map displaying the continents.
6.	Pan icons	Used to “drag” the map left, right or up and down. The direction the arrow points shows the direction new map area will reveal. For example, if the operator wishes to see above the top of the displayed map, he clicks the up pointing arrow. The map shifts to display a more northern view.
7.	Center Marker icon	Used to center the map on the red dot marker. This icon performs two functions. If the red center dot is outside the currently viewed map, click the icon to place the marker in the center of the display. If the marker is inside the map displayed, click the icon to cause the display to center on the marker.

M. To Change Map Intensity.

An operator may darken or lighten the map background intensity. This assists in viewing overlays if the overlay features are "lost" in the map's colors. To change the map intensity, select Map Options | Map Intensity on the map menu bar. Select the desired intensity by moving the sliders to the intensity desired. When the desired intensity is set, click the OK button.

N. NIMA Map Backgrounds.

WARNING!!

Do not use NIMA map background features for coordinate locations or situational awareness associated with AFATDS map overlays. Map construction methods can result in discrepancies in coordinate registration.

1. Load Map Products.

AFATDS allows the storage and use of National Imagery and Mapping Agency (NIMA) products for map backgrounds. AFATDS supports map backgrounds using the following formats: Raster Product Format (RPF), Digital terrain Evaluation Data (DTED), ARC Digitized Raster Graphic (ADRG), and Vector Product Format (VPF). A sample loading procedure for the NIMA Compressed ARC

Digitized Raster Graphics (CDRG) maps imagery, a RFP format background, is shown below.

Step	Action	Result
1.	Insert the map CD in the CDROM drive.	The File Manager window displays. Close this window by clicking File, Close.
2.	On the map menu bar, click Map Options, Load CD.	The RPF Loader window displays.
3.	Click the Enter a Name… field and type a name for the map.	Use of the CD item number, found on the CD case provides a means of supplying a unique name that can later be referenced.
4.	Click the OK button.	The RPF Loader window prompts Copy RPF Database '*name entered above*' to disk?
5.	Click the YES button.	The RPF Loader Progress window displays the state of data copy using a sliding bar. Wait for Loaded indication.
6.	Click the OK button.	The RPF Loader window closes.
7.	On the Main Menu Bar, click System, Disk Utilities.	The Disk Utilities window displays.
8.	Click the Media Device: button and select Compact Disk.	The Operations: list displays Eject.
9.	In the Operations list, click on Eject	Eject highlights and the Apply button becomes active.
10.	Click the Apply button.	The CD ejects and Disk Ejected displays in the window.
11.	Click the OK button.	The Disk Utilities window closes.

2. Displaying Map Backgrounds.

After loading map products, the AFATDS operator must specify what areas and scales to display on the map background. A sample procedure for displaying map backgrounds is shown below.

Step	Action	Result
1.	On the map menu bar, click Map Options, Map Features, RPF maps.	The RPF Editor window displays. All loaded maps are displayed. The NW Corner column displays location of that map's NW corner in the system (UTM, LAT/LONG, MGRS) selected for the map. Yellow boxes overlay the AFATDS map displaying the location of all map tiles.
NOTE: As an aid in sorting the map files, clicking the column headings in the RPF Editor window sorts the columns.		
2.	On the RPF Editor window, click the desired map files to display.	Multiple individual files may be selected or a group can be selected by clicking on the first file of the group then pressing the <Shift> key and clicking the last file in the group. All files between the top and bottom selected will highlight.
3.	Click the ON button and the Apply button.	All selected map files display On in the Toggle column.
4.	Click the Exit button.	The RPF Editor window closes.
5.	On the map menu bar, click Map Options, Map Types, RPF Map by Tiles.	Those map files selected in step 2 are displayed.

NOTE!

PCL printers do not print geometries very well. If on the Add Printer window, your printer has a printer model of PCL_Parallel_Port or PCL_LAN you will have this problem. To print geometries on a PCL printer, select Map Options/Map Types/WVS Vector Map. Then select Map Options/Map Intensity and adjust the Foreground Intensity and Background Intensity until you can print the geometries you want to print. For example, a Foreground Intensity setting of 200 and a Background Intensity setting of 150 will print everything on the map, except for the Unit Function Symbols.

System Initialization
UCU / CCU-2 (SUN) Security Operations Suite (SOS)

The Security Operations Suite (SOS) provides an easy method to do the administration, report generation, report inspection, and intrusion alerts for four C2 Protect Toolbox tools. To access the SOS tools, log in as secman. Then select Start\Programs\Security Functions\SOS GUI. The Security Operations Suite (SOS) Main Menu will then appear providing a button to access each of the four C2 Protect tools: TCP Wrapper, Change Detection Tool, Swatch, and McAffee.

A. TCP Wrapper.

TCP Wrapper is used to authenticate TCP and UDP connections to hosts. When an inbound request for the TCP Wrapper service arrives, the TCP Wrapper checks to see if the request is authorized. If the request is authorized the request is granted. If the request is not authorized, the request is denied and the request is logged as not being authorized. The TCP Wrapper Modify Configuration window allows the Security Manager to select the configuration that is allowed access to the workstation. When an inbound request is refused connection, the operator is notified by an alert.

B. Change Detection Tool (CDT).

The Change Detection Tool provides change detection on files, users and groups. It can detect changes to file attributes such as permissions, ownerships, modification time, and the appearance (or disappearance) of files. After selection of the Change Detection Tool button, the Change Detection Tool window allows the Security Manager to select the files to inspect, i.e. operating system or applications. The Security Manager for the selected file can Run Change Detection to identify changes, View Change Detection Reports, Schedule Change Detection for when to automatically run CDT, or Update System Baseline. Using the Schedule Change Detection capability the Security Manager can select the specific hours and minutes past the hour to run the CDT.

C. Simple Watcher (Swatch).

Simple Watcher monitors the system audit files for refused connections identified by TCP Wrappers and issues an alert to the operator. The alert posts date, time, service, and source/destination address of the refused connection. Swatch also monitors for system errors, vulnerabilities from security misconfigurations, inadvertent user modification of files, intrusions, and viruses. After the selection of Swatch, the Swatch: Modify Configuration window allows the Security Manager to select the configuration to activate and displays the SOS tools for which it will provide an alarm for that selection.

D. McAffee Anti-Virus for Hard Drives.

McAffee Anti-Virus automatically monitors the workstation for viruses. It also provides on-demand detection of viruses on the workstation hard drive(s), prevents virus-infected programs from running, detects viruses from various media, and prevents infected programs from being copied. After selection of the McAffee button, the McAffee: Utility window allows the Security Manager to select the media to scan. The Security Manager for the selected media can Scan Now to identify infected files, View Scan Reports, Schedule Scans for when to automatically run scans, or Update Virus Detection Files. Using the Schedule Scans capability the Security Manager can select the specific hours and minutes past the hour to run the McAffee Anti-Virus. The SOS McAffee Anti-Virus only scans the workstation hard drives, not any floppy or OD drives. To scan floppy or OD drives see the McAffree Anti-Virus scan paragraph for floppy and OD drives below.

E. McAffee Anti-Virus for Floppy and OD Drives.

While not a part of the SOS, a separate McAffee Anti-Virus provides on-demand detection of viruses on floppy and OD drives. To access the McAffee Anti-Virus for floppy and OD drives, log in as secman. Then select Start\Programs\Security Functions\McAffee Virus Scan. A window will open with three options to choose from: 1) Scan Floppy Disk, 2) Scan Optical Disk (one side only), and q) Quit. These options are self-explanatory. These scans cannot be scheduled.

System Initialization
Keyboard Equivalents

Many menu selections and trackball actions have equivalent keyboard keystrokes. This is useful to speed up access to frequently used windows or to have a backup plan if the trackball becomes inoperable. The trackball equivalents only work if the trackball goes out or becomes inoperable. The menu keys are always available.

A. Accelerator Keys. These allow rapid access to windows without pulling down menu items. An accelerator key is activated by holding down the CTRL key while pressing another key then releasing the CTRL key.

The window which you are trying to access menu items from must be the window in focus, that is, the window must be the front-most window on your display in order for the accelerator key to work.

Accelerator keys are lower case keys. Ensure that "caps lock" is off when using accelerator keys.

WARNING!!

The Emergency Purge function deletes all data from the AFATDS disk drives at all of the workstations in an OPFAC configuration. If you only want to purge the data from a single workstation, you need to insure that it is in a stand-alone mode with no other workstations connected to it.

Main Menu Bar	CTRL +
Emergency Purge	b
New Message	*n
Print Window	p
Shutdown	d

Current Window Menu	CTRL +
Active Target List	t
Center Map	c
Edit This Unit	u
Exit Current	e
Initiate Fire Mission	i

Main Menu Bar	CTRL +

* Comm must be enabled.

Current Window Menu	CTRL +

B. Keyboard Equivalents of Map-Related Actions.

To Perform This.	Do This.
Display PAN Window (toggle)	<Esc>
Display Re-Center Cursor (toggle)	<F6>
Display Zoom-Area Cursor (toggle)	<F4>
Drag PAN Window Small Increment	Arrow Keys
Drag PAN Window Large increment	<Shift>+<Ctrl>+ Arrow Keys
Move Map Right	→ or Num Pad 6
Move Map Left	← or Num Pad 4
Move MapUp	↑ or Num Pad 8
Move Map Down	↓ or Num Pad 2
Move Map Right a Large Amount	<CTRL>+<Shhift>+→
Move Map Left a Large Amount	<CTRL>+<Shhift>+←
Move Map Up a Large Amount	<CTRL>+<Shhift>+↑
Move Map Down a Large Amount	<CTRL>+<Shhift>+↓
Activate Window Button	<Space>
Activate Menu Selection	<Enter>+<Space>
Change Active Window/Menu	<Alt>+<Tab>
Toggle Between Window Fields and Window Menus	<F10>
Toggle Between Current Active Window/Menu and Last Active Window/Menu	<Alt>+<Shift>+<Tab>
Choose Menu Selection	<Enter> or <Space Bar>

To Perform This.	Do This.
Choose Button Selection	<Space Bar>
Move in Pull-Down Menu	Arrow Keys
Close Pull-Down Menu	<ESC>

C. Keyboard Equivalents of Window-Related Actions.

To Perform This.	Do This.
Move Between Fields Forward	<TAB>
Move Between Fields Backward	<SHIFT>+<TAB>
Move Cursor Right Within a Field	RIGHT ARROW
Move Cursor Left Within a Field	LEFT ARROW
Move Cursor Up Within a Field	UP ARROW
Move Cursor Down Within a Field	DOWN ARROW

System Initialization
Hard Disk Purge

Purging a hard disk deletes all data from the hard disk. There are two methods of purging a hard disk in the AFATDS system, an emergency purge and a disk purge. The emergency purge should only be used in time sensitive situations, such as imminent capture of the workstation by the enemy. The emergency purge, while erasing all data from the AFATDS hard disk, does not meet existing security requirements for a purge. It is possible that data could be reclaimed from a hard disk that had its data erased by an emergency purge. The normal method to declassify a hard disk is to use the disk purge. The disk purge procedure meets existing security requirements for purging a hard drive. In order to make an AFATDS workstation operational after completion of a purge, software will have to be reinstalled and databases restored from an archive.

WARNING!!

When the security level of a workstation is lowered (i.e. from secret to unclassified) the workstation hard disk must be disk purged. When raising the security level of a workstation (i.e. from unclassified to secret), that has been utilized at the lower security level, the hard disk must be disk purged and a fresh load of software loaded.

A. Emergency Purge. The emergency purge deletes all data from the AFATDS hard disk drives at all workstations in an OPFAC configuration, this includes all databases as well as the AFATDS and operating system software.

NOTE!

In a multi-workstation OPFAC, only the workstation with the "Sysadmin" duty can perform an emergency purge. When the workstation with the "Sysadmin" duty performs an emergency purge, all of the AFATDS hard drives on all of the OPFAC workstations are purged. If a workstation has multiple hard drives, only the AFATDS hard drive is purged.

Emergency Purge

Step	Action
1.	Select System\Emergency Purge.
2.	When the Emergency Purge Order window opens select "Purge...".
3.	When the Purge Entire OPFAC window opens select Purge.
4.	A notification will be provided to notify the operator is the purge was successful or not.

B. Disk Purge. This is the preferred method to purge a disk. It is the only method that results in a completely unclassified disk.

Disk Purge

Step	Action
1.	Insert the "PURGE for Hard Disk Drives" cd, version 1.0.0.00DEC07.
2.	Press Stop-A.
3.	Type "boot cdrom".
4.	When prompted for an address, type "a". The operator will be notified that the address is bad.
5.	When prompted for an address, type "27". The operator will be notified that the address is bad.
6.	When prompted for an address, type"3". The purge will continue.
7.	While the purge is running, typing Ctrl-C or Stop-A will verify that the purge has not been interrupted.
8.	Wait for the purge to complete, this may take several hours.
9.	After the purge is complete, verify that write pass 1. write pass 2, write pass 3, read pass and the purge were successful.

System Initialization Troubleshooting

Find the symptom of the problem you are having in the first column. In the second column, in order of probability, are listed potential problems and fixes to make.

Symptom	**Potential Problems**
When attempting to start up, machine will put some messages on the screen but will not go any farther. Screen may even go blank.	1) The SCSI bus has not terminated properly. Immediately power down and consult the directions under Section 1.B.3, “SCSI Cable Connections”.
	2) The SCSI addresses on the equipment are set wrong. Immediately power down and consult the directions under Section 1.A, "SCSI Switch Settings".
	3) Equipment is not grounded properly. Ensure all equipment (including UPS) on all workstations are properly grounded.
	4) Hard drives are not inserted well. Power down all equipment and re-seat drives carefully. Make sure latches are closed properly.
	5) Some equipment on the UCU is damaged. Disconnect TCIMs from the back of the UCU. Power up and see if it will startup. If so, you have one or more bad TCIMs or cables. If it still does not work, you most likely have a bad UCU. Replace failed equipment.
	6) Keyboard is disconnected. Shutdown, connect keyboard and restart.

Symptom	Potential Problems
Workstation shuts down automatically before Login window is presented.	1) SCSI addresses are not set correctly. Power down all equipment and check SCSI addresses. Fix any that are wrong.
	2) SCSI cables not seated properly or are defective. Shutdown workstation and re-seat cables. Check for bent pins on the cables; if pins are bent, replace cable. Optionally replace the cable with a known working cable.
	3) Hard drive is loose. Re-seat hard drive in UCU/CCU.
	4) Software is corrupt. Reinstall AFATDS software.
	5) The hard drive is damaged. Replace hard drive.
	6) UCU has bad power supply. Replace UCU.
On the login, entered user name and password do not allow entry into AFATDS.	1) Login given was typed incorrectly or is invalid. Consult system administrator for new password.
	2) Bad Hostname or IP entered at software load. Consult System Administrator for the correct Hostname or IP.
Trackball will not move the cursor on the screen.	1) Trackball is dirty. Clean or replace the trackball/keyboard.
	2) Keyboard, Trackball or UCU is damaged. Replace one or all. You may be able to use your keyboard equivalents if only your trackball is damaged. As a last resort, replace the entire UCU.
As soon as AFATDS is started, workstation shuts down unexpectedly.	1) Database is corrupt. Restore a known working database.
	2) Software is corrupt. Reinstall AFATDS software.

Symptom	Potential Problems
Soon after you start AFATDS, a medium level alert appears which says Optical Disk is Full.	1) Archive disk inserted is nearly full. This is not a problem. Turn the optical disk upside-down so that the database side can be read.
The Unit Configuration window shows your TCIM(s) are not operational.	1) TCIM(s) are not powered on. Power on TCIM(s), refresh Unit Configuration window several times by selecting "Options | Refresh" until TCIM(s) show up operational.
	2) TCIMs are not set to correct SCSI addresses. Check to ensure first TCIM is set to "4" and the second to address "5". Make sure you POWER DOWN TCIMs before changing SCSI addresses.
	3) TCIMs are not connected to the UCU. Power down and connect TCIMs to UCU as shown under Section 1.B.3., “SCSI Cable Connections”.
	4) The SCSI bus is not terminated properly. Immediately power down and consult the directions under Section 1.B.3., “SCSI Cable Connections”.
The Unit Configuration shows a LAN Card ID of "00000000" and the LAN will not work.	1) The UCU has one or more bad LAN cards. Replace the UCU or go without the LAN.
As soon as Unit Configuration is activated, workstation shuts down unexpectedly.	1) Database is corrupt. Restore a known working database.
	2) Software is corrupt. Reinstall AFATDS software.
The Situations menu stays grayed out long after the workstation was started. More than 10 minutes.	1) The Unit Configuration was not activated. If the Unit Configuration window is not open, re-select it by selecting the menu “System | Configuration | Unit”. Verify the Unit ID and Unit Role and then select “Activate” on this window before closing it.

Symptom	Potential Problems
	2) Database is corrupt. Backup current database to a disk and restore a known working database. If this does not fix the problem, restore the original database.
	3) Software is corrupt. Backup the current database, shutdown OPFAC, reinstall AFATDS software and then restore original database.
The Situations menu enables, but the data in the machine is wrong or does not exist at all.	1) The database has been overwritten. Most likely due to a change of the Unit ID on the Unit Configuration window. Restart and restore the original database. Once the database is restored. When the Unit Configuration window opens, you may change the Unit ID to your OPFAC's ID and then "Activate" (make sure the unit role is correct).
The Situations menu enables, but some options are not enabled (e.g. Mission Toolbar, Communications, etc.).	1) You are in a multi-workstation OPFAC and the appropriate Assignment has not been selected. Select the appropriate Assignment from “System | Assignments”. The first workstation logged into gets all Assignments and it is up to other workstations to select them themselves.
	2) The database is corrupt. Backup the current database, shutdown OPFAC, reinstall AFATDS software and then restore original database.
Printer is connected properly but does not respond when attempting to print.	1) Printer is not added to the workstation. Select “System | Configuration | Printers | Printer Services”. If a printer is not displayed in the Printer Services window, add the printer by selecting "Configuration | Add Printer...".
	2) Printer is jammed. Check for a red light on the printer and check inside for paper jams.

Symptom	Potential Problems
	3) Printer is off-line. Make sure the printer is on-line. To turn a printer on- and off-line, press the On-Line button.
	4) Printer needs resetting. Cycle power on the printer and try again.
	5) Printer is down. Open the Printer Services window and select "Printer | Start Printer".
	6) Printer is disconnected. Check to see if the printer is connected to your workstation. Check the cable connections to see if they are secure.
	7) Address wrong on LAN printer. Make sure IP address of printer matches that entered via “Access LAN Printer”.
	8) Name is wrong for LAN printer. Make sure the printer named in “Access LAN Printer” matches the name specified via “Configuration | Add Printer” under Printer Services.
	9) LAN is not turned on. When printer is on External LAN, the External LAN needs to be placed in the comm configuration and turned on before the printer can be reached via “Access LAN Printer”.
Printer prints improperly.	1) Printer options are set incorrectly. Check printer settings and fix then try again. For a laser printer (either via parallel port or on a LAN), the PCL and POSTSCRIPT options should match as configured in OPFAC and on the printer.

Symptom	Potential Problems
Not all or none of the symbols appear on the map.	1) The Map is not displayed yet. Select “Map | Display Map”. Ensure there are overlays specified in the Overlays In Use window and that they are turned ON.
	2) No overlays are turned on or the overlays being used are set up incorrectly. Check all overlays.
	3) The map is scrolled to an empty area. If the map is scrolled to an empty area, select the “Map | Find Symbol...” menu, select a symbol and an overlay to find it on and click “OK”. This will scroll the map to the area of the selected symbol.
	4) Map symbols have been selected and hidden with the “Map | Filters | Hide Symbols” option. Select “Map | Filters | Show Hidden Symbols”.
	5) No units, geometries or targets exist in the plan or in Current. Open a Select Unit or Select Geometry window and make sure units and geometries have been created. If not you may have erased your database by changing the Unit ID.
When entering coordinates, they are converted to coordinates in an adjacent grid zone.	1) Grid zone of the coordinate entered is actually in the zone which is re-displayed to you. AFATDS automatically converts grid coordinates which are actually in another grid zone. This is not a problem but can cause confusion if not understood. To ensure correct entry of the coordinate, retype the grid into the field.

Symptom	Potential Problems
When attempting to scroll the map, it will scroll to a given point and will not scroll further.	1) <u>You have reached the edge of the grid zone</u>. When displaying a given grid zone, you may scroll to an area no more than 40 km. either side of the zone. Once you reach this 40 km. extension, you must “Switch Grid Zones”. This is done by selecting "Map | Change Grid Zone | <direction>" where <direction> can be North, South, East, or West.

Communications
About AFATDS Comm

A. Configurations, Networks, Destination Units.

AFATDS allows communications over a variety of links: wireline, EPLRS, SINCGARS, MSE, etc. Most links allow a variety of protocols and data rates. Each single link which units can talk on is called a Network, and a collection of networks form a communication plan called a Configuration. On a Network, each subscriber, or unit, is called a Destination Unit. Each Destination Unit (subscriber) will have an address and other relevant information associated with it.

In some non-AFATDS systems, only one communications plan can be stored. This is sometimes referred to as the Subscriber Table or the Routing Table. In AFATDS any number of communications plans can be stored, while only one of which can be active, see Figure 23. These stored plans are known as Planned Configurations, while the active one is known as the Current Configuration. Having multiple configurations (1) allows CONOPS planning in case an OPFAC were to be lost due to movement or destruction and (2) provides the capability for one OPFAC to create communication plans for a number of other OPFACs without actually using them itself.

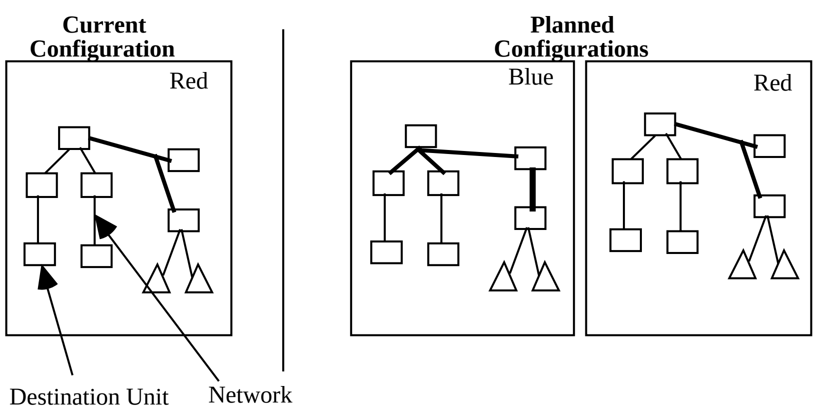


Figure 23. Many configurations may be developed. Only one can be Current.

B. Acquiring the Comm Assignment.

Once a multiple workstation OPFAC has been activated, the operator who intends to perform communications management must select the "System | Assignments | Comm Administrator" menu item, if it is not already selected. This can only be selected at one workstation within the OPFAC at a time, because all alerts having to do with Communications will be directed to this workstation. If the OPFAC only has one workstation, this is not applicable. (See System Initialization: Multi-workstation Notes.)

Communications
Alternate Net Routing

A route is a communication path from one unit to another either directly on a given net or indirectly hopping through one or more units. AFATDS will allow up to three routes to be specified for a given unit: a Primary route, a Secondary route and a Tertiary route. Only one of these routes may be set up as an indirect route. The indirect route must be the last route defined. This means that once an indirect route has been defined no further alternate routes can be defined, e.g., if the Secondary route has been defined as an indirect route, a Tertiary route cannot be defined.

Initially, an OPFAC talks to all destination units on their Primary routes. If a message fails on the Primary route, the unit's route may be switched over to the Secondary route, if one exists. If this fails, the unit's route may be switched over to the Tertiary route, if one exists. Once the last existing route fails, the unit may be switched off and the route set to None.

AFATDS performs automatic switching of direct routes only. Furthermore, AFATDS performs automatic switching only when it can detect a data link failure on a direct route. AFATDS can detect data link failures on radio and wire line nets but not on a LAN. Also, AFATDS can only detect a data link failure for the direct portion of an indirect route. For example, if a data link failure is detected between the originating AFATDS unit and the intermediate unit, the direct route to the intermediate unit will be switched (the indirect route to the destination unit will not be switched, i.e., the route will remain indirect through the specified intermediate unit). If, however, a data link failure occurs between the intermediate unit and a subsequent unit, the route to the intermediate unit will not be switched at the originating AFATDS unit. The route at the intermediate unit, however, may be switched if an alternate route was defined. Note that even though AFATDS does not perform automatic switching of indirect routes, the actual message path for indirect routes could be affected because the first hop of an indirect route is always a direct route, which may be automatically switched.

To set up alternate net routing for a unit, refer to step (12) in the "Communications: Building a Configuration" section.

Communications
Building a Configuration

Before starting a new comm configuration, it is very helpful to first determine the networks needed, units on those networks and addresses (and observer numbers if necessary) for each unit on a network. It is also useful to build the configuration as a Planned Configuration with a name which identifies how or where you will use it (for example, NTC, CPX 3, TEST, etc.). This allows you to keep track of configurations easier.

1. Select the menu "System | Configuration | Communications | Planned...". This will open the "Select Comm Configuration" window.

2. On the "Select Comm Configuration" window, select the menu "Options | New...".

3. On the Planned Networks" window, enter the name of the new configuration you want to build. Note that this is NOT a network name but is the name of the planned configuration you are creating. You may create many networks in a single configuration.

4. Once entered, select "OK" to close the window.

5. Now, select the configuration name just entered in (3) and select the menu "Options | Edit".

6. For each network you need to build, select "Networks | New..." . On the "Net Channel Settings" window enter the relevant information for the network and then click "OK" to save these changes.

IMPORTANT!!

Appendix C lists all valid network combinations of protocols, media, encoding methods and baud rates.

7. After entering networks, all units on those networks must be specified. Select the menu "Options | Destination Units" to open the "Comm Unit Configuration" window.

8. Select the menu item "Option | Add Unit" to open the "Select Unit" window. On this window select all units for the configuration. Multiple unit selections are allowed on this window. This window may be accessed at any time to add more units to the configuration. To unselect a unit on this window, just click it again.

9. For each unit added, select the unit and then the menu item "Options | Edit Route". Complete steps 10-12 for each unit.

10. The "Edit Routes" window will open for entry of relevant information for each unit. On this window, the “Primary” route will be selected initially.

11. Select Direct (on a net) or Indirect (via another unit) to specify the route to the unit. Then select the VIA menu to choose the net or unit you will communicate on or through. Make sure that if observer numbers are needed that they are entered and match what the observer is using.

    If a direct network, enter the address of the unit on that Network. If the Network is an EPLRS network, enter the LCN here. Remember that the LCN given to you from the NCS is in Hexadecimal and must be converted to Decimal for AFATDS. See Appendix G for Hex to Decimal conversions.

12. If a Secondary or Tertiary route needs to be specified for the unit, select Secondary or Tertiary and complete the steps in (11) again.

13. Click “OK” to close the Edit Routes window.

14. Once net assignments and addresses have been completed for all units, click "OK" on the "Communication Unit Configuration" window and then "OK" on the "Planned Networks" window to save the configuration.

15. To implement the Configuration you just built, see the next section, “Communications: Implementing a Configuration”.

Communications
Implementing a Configuration

Before continuing, it is very helpful to first determine what channels of the TCIMs are connected to which networks. In step 6, this information is required.

1. Make sure that the new comm configuration exists as a planned comm configuration. (See previous section, “Communications: Building a Configuration”.)

2. Select the menu "System | Configuration | Communications | Current". This will open the "Current Networks" window.

3. On the "Current Networks" window, ensure that all networks are shown as "Disabled". Select the menu item "Control | All Off".

4. Next, select the menu item "Options | Select New Current..." and on the "Select Comm Configuration" window choose the desired planned configuration which you wish to implement. Click "OK" on that window. The networks for the new configuration will appear in the "Current Networks" window; the configuration will be shown as "Saved". Note that you cannot implement a planned configuration if it contains the local unit as a destination unit; an error message indicates if this is the case when “OK” is clicked on the “Select Comm Configuration” window.

5. At this time, actual channels on the TCIM(s) must be associated with the networks in the configuration. Select the menu item "Networks | Assign Channels". This will open the "Net Channel Assignments" window. (Note: When using VMF Balanced Networks, more than one TCIM channel will need to be assigned to a network.)

6. On the "Net Channel Assignments" window, for each network or channel of a network, select the network and the workstation/channel for which it should be associated and click the "Down Arrow" button. The network will now appear next to the workstation/channel. Nets can be disassociated from a channel by selecting the workstation/channel and then selecting the up arrow. When finished, click "OK" to close this window.

7. Finally, each network must be enabled. This can be done in one of two ways: (1) for each network, select the network and then select "Control | On" (wait until the net(s) show as enabled (may be a delay) before continuing to the next one) or (2) Select “Control | All On”. Click "OK" to save your configuration and close the "Current Networks" window.

8. It may be necessary to correct serialization numbers for units which use serialization (e.g. BCS). This is done by selecting “Options | Set Serialization” on the Edit Routes window for unit and filling in the required numbers. If you elect not to do this, AFATDS will fail the first message to that destination unit (if it is non-AFATDS), but will automatically synchronize the serialization so that the next message will have the correct serial number.

Communications
Verifying Communications with Test Messages

After loading a new Current Configuration, it is necessary to establish that good connections exist to other units. This is generally done by way of a Test Message but can be done with PTMs, Fire Missions and other messages.

A. Test Message.

1. Select the Destination Units icon from the tool bar.

2a. To send a test message to one unit, select the unit then “Test Message | To Selected Unit”. Click OK or click on "Send Test Message". Then select "View Message Status” and click “Refresh” occasionally until either Failed or Successful appears next to the unit.

2b. To send a test message to every unit on a given network, select a unit on that network then “Test Message | All Direct via Net”. Make necessary selections and click SEND on that window and select “View Message Status” and click “Refresh” occasionally until either Failed or Successful appears next to each of the units.

2c. To send a test message to every unit which is indirect via a given unit, select the unit you route through and then “Test Message | All Indirect via Unit”. Make necessary selections and click SEND on that window and select “View Message Status” and click “Refresh” occasionally until either Failed or Successful appears next to each of the units.

2d. To send a test message to selected units, select units from list and then select "Send Test Message".

3. Once a test message passes successfully, it is sometimes useful to attempt to send a message that contains data. This might be a PTM, a unit status update or even a test fire mission (only if appropriate).

B. Plain Text Message (PTM).

1. To send a PTM for communications checks or for any other reason, select "Create Free Text Message" from the "Main Menu" bar. This will display the "Device Types" window. The "Device Types" window lists the devices that can receive a Free Text message. Select the device type of the unit you wish to communicate with, then click on "OK". Only one Device Type can be selected. The Free Text window opens to allow the operator to enter text. After all text has been entered, the operator then addresses the message by selecting "Options/Edit Header/Add Units". After units are selected, "OK" the window. Then select the "Send" button on the Free Text window.

2. To send other informational type messages (geometry, unit updates, etc.) that have SEND buttons on the window. When send is selected, the "Select Unit" window will appear displaying all distribution lists and only the units included in the Current Communication Configuration for possible selection.

Communications
TACFIRE vs VMF

VMF and TACFIRE are very different, yet very similar. All in all, they are similar protocols that can be utilized over a wide variety of communication media (CNR, Wire, SINCGARS, MSE, etc.) with the associated baud rates and modulation encoding techniques. The following explains the upgrades that VMF offers over TACFIRE rather than just the sheer differences for differences sake between the two protocols.

A. Variety of Media and Speed Combinations. VMF is more capable than TACFIRE, with respect to combinations of media supported and associated data speeds and encoding techniques. This is primarily due to the limited, existing TACFIRE equipment and not the protocol itself. AFATDS does not allow the operator to configure a combination that a TACFIRE protocol device can not support. For an example, look at the Net Channel Settings window to see the specific combinations each protocol allows.

B. Error Correction. VMF also provides EDC/FEC using the more capable GOLAY method rather than the older Hamming code used by TACFIRE. VMF also allows grouping of segments of messages to minimize radio time; two or more segments can be transmitted at once while only paying the price of radio key and preamble time once.

C. New Acknowledgment Scheme. Another upgrade VMF provides is the separation of the acknowledgments (ACKs) from the transmission by use of its windowing acknowledgment scheme (patterned after LAP-B and HDLC). This decoupled acknowledgment is only used with VMF Type II which is automatically invoked by the system when the two OPFACs are alike (i.e., AFATDS to AFATDS transfers). This decoupled acknowledgment scheme should save appreciable amounts of bandwidth as well as allowing more usable net time due to no ACK hold delays (i.e. dead time), especially when the flow of data between two OPFACs becomes heavy. The Type I and Type II can be used by the same machine at any time since VMF was designed to allow Type I subscribers (USMC DCT) to remain unaffected by the Type II upgrades which came after Type I (Type I is actually USMC MTS Broadcast).

D. Larger Data Sizes and More Addresses. Another difference in the two protocols is that VMF is a binary protocol which utilizes the full 8 bits of every byte rather then being an ASCII (character) 7-bit byte based protocol like TACFIRE. Even TACFIRE BOM, bit-oriented messages, use 7 bit bytes and still have ASCII headers. This allows the same message to be squeezed into smaller message transmission time. This has a benefit of allowing VMF more addresses than TACFIRE for a single network. This is because it allows numeric addresses within the range of 0 and 2-95 (address 1 is reserved for testing) rather than just A-Z, 0-9 and alphanumeric as in TACFIRE.

E. Balanced Networks. Another difference is the ability to utilize network balancing. This allows a network to be spread over multiple channels instead of one channel which multiplies the amount of data which can be sent at any one time on a network by the number of physical channels (1 to 4). Note that only AFATDS subscribers can be on a balanced net.

Communications
LAN Communications

A. Local Area Network. Local Area Network, or LAN connections, allows computers to communicate with one another at extremely high speed. Successful LAN communications depend on correct setup. First, the coaxial cable that provides the physical LAN connection between computers must be set up correctly. Any connections not plugged into a computer must be properly terminated. All computers on the network must have the correct Internet Protocol (IP) address, the correct hostname, and if the LAN is connected to remote stations using a Router, the correct “Default” address.

1. IP Address: The unit’s IP address is it’s unique physical address on the network. The IP address is made up of four numbers, or ‘octets’, separated by decimal points known as ‘dots.’ e.g. 178.12.5.123. When manually entering IP addresses in AFATDS, the network portion of your workstation’s IP address and the network portion of any other system's IP address on the LAN must match in order for you to communicate with them.

2. Hostname: The hostname acts much like the IP address, i.e. it is a unique identifier for units on the network. It is generally given in descriptive word form, e.g. ‘divarty-4md.’ The hostname should never begin with a numerical character, e.g. "4md-divarty."

3. Domain: The unit's domain represents the logical placement of the workstation within the LAN architecture. This parameter is required to communicate with other units that use fully qualified domain names on the LAN. A unit's hostname along with the domain represents the fully qualified domain name. If the hostname of a workstation is "divarty-1cvd" and its domain is "army.mil" then the fully qualified domain name is " divarty-1cvd.army.mil".

4. Subnet Mask: The subnet mask tells AFATDS what portion of the IP address is the network address and what portion is the host address.

5. MPN LAN and Default Address: An MPN LAN is somewhat different than a regular LAN. An MPN LAN includes a Tactical Name Server (TNS) device. The TNS automatically assigns IP addresses to computers when they ‘register’, i.e. when the LAN is activated. The TNS is connected to other TNS devices, which are in

turn connected to other LANs. The TNS allows devices on one LAN to talk to devices on other LANs. Whenever AFATDS sees an IP address not on its local subnet (i.e. one or more of the first three octets in the IP address are different from its own IP address), it sends the message to the default address, which is the address of the TNS. The TNS then routes the message to the next appropriate TNS, until the message finally reaches the LAN with the destination IP address.

6. Router: An AFATDS communications configuration may indicate that a unit is reachable over a certain LAN network when the address of the unit is such that it is cannot be directly connected to the network. In those cases, a router is employed as a means to pass the message from the directly connected network toward the network where the unit is connected. For this mechanism to be employed, the router needs to be set up on the same screen where the network's Hostname and IP address is set up. There is a Router Addressing section on the screen where the router's Hostname and IP address can be added.

7. Domain Naming System (DNS) / DNS IP Address Lookup: This is an AFATDS communication capability that will use a DNS server to associate hostnames and IP addresses. This allows AFATDS the capability of name-to-address mapping for client applications. This is much like the way hostnames are associated with IP addresses on the Internet. When the AFATDS operator builds a new IP network he will be able to designate if a DNS server will be supporting the network. The operator will select the DNS radio button on the new IP network window. He will then be able to designate up to three (3) DNS server IP addresses by entering them in DNS Parameters window. Search order and domain name is also specified on this window. When AFATDS is operating in the ABCS environment a download of the Command and Control Registry (C2R) will trigger an automatic lookup of IP addresses using DNS.

8. Fire Support on the (TI): AFATDS communication on the Tactical Internet (TI) will be able to support up to four (4) fire support subnets on each LAN controller card. This capability will allow AFATDS to operate on multiple LAN channels for enhanced fire support capability. The subnet channels are created each time a new IP network is built. When the operator assigns the channel for a new IP network, another Primary LAN channel is added to the list in the Assign Channels window. This capability is intended to enhance communications with FBCB2 subscribers when operating in the FDD environment.

B. To setup a manual LAN network.

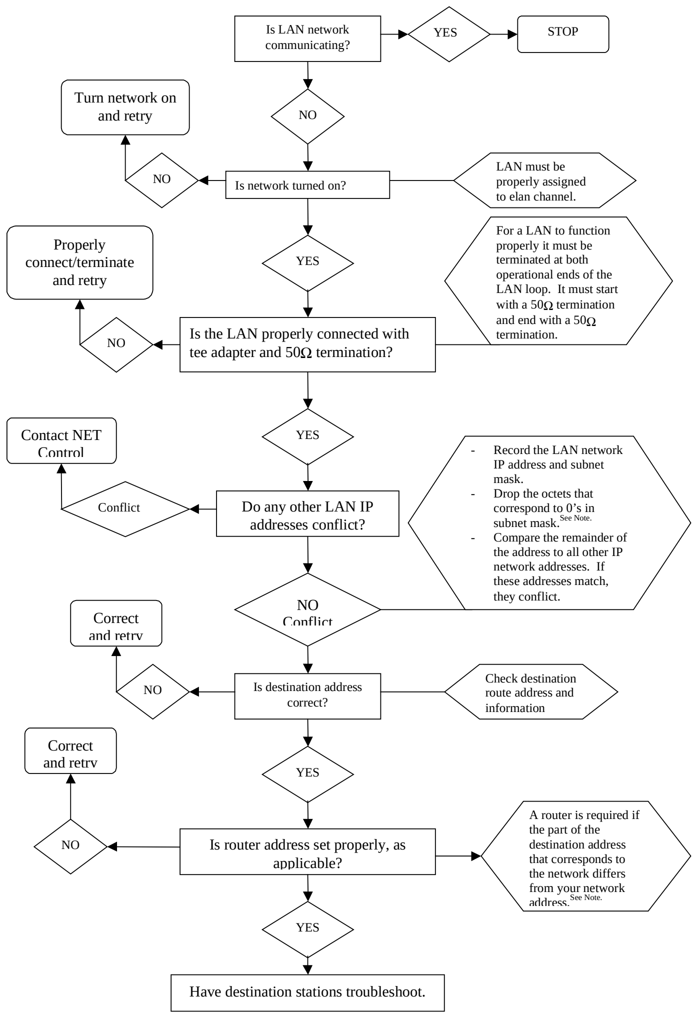
1. Select System -> Configuration -> Communications -> Current
2. Select Network -> New IP
3. Enter network name, Hostname, IP address, Domain, and Subnet Mask. Enter the router Hostname and IP address if a router is used.
4. Select OK.
5. Assign Channels. Associate network name and Elan.
6. Assign a remote subscriber to the network before activating.
7. Switch network ON.
8. Insure physical LAN connection properly established and terminated. Send test msgs to other units on network.

C. To setup an MPN LAN.

1. Select System -> Configuration -> Communications -> Current
2. Select Network -> New IP
3. Enter network name, Hostname, change Manual selection to MPN.
4. Select OK.
5. Assign Channels. Associate network name and Elan.
6. Insure physical LAN connection properly established and terminated.
7. Switch network ON. This should cause AFATDS to 'register' with TNS, which will assign an IP address, and provide AFATDS with IP addresses and hostnames for other devices on the LAN.

D. LAN Network Troubleshooting Flow Chart.

If a LAN Network is not working, the following LAN Network Troubleshooting Flow Chart provides an aid in determining why a LAN Network is not working.



NOTE:

IP Network

Classes	IP Ranges	Subnet Mask	Network Address
A	0.0.0.0 – 127.255.255.255	255.0.0.0	First Octet
B	128.0.0.0 – 191.255.255.255	255.255.0.0	First and Second Octet
C	192.0.0.0 – 233.255.255.255	255.255.255.0	First, Second, and Third Octet
D	Reserved		

Never duplicate an IP address

Figure 24. LAN Network Troubleshooting Flow Chart

Communications
ABCS Communications

A. Overview. ABCS, or the Army Battlefield Command System, is the Army's main thrust for digitization of the battlefield and sharing of command and control information. Besides AFATDS, four other ABCS BFAs (Battlefield Functional Areas) exist: ASAS (All Source Analysis System), CSSCS (Combat Service Support Computer System), AMDWS (Air Missile Defense Warning System) and MCS (Maneuver Control System). AFATDS communicates with these other four BFAs over LAN and MPN LAN connections using the USMTF messages.

B. ABCS Basics. For correct ABCS communications to take place, the following needs to be determined for each ABCS unit you will communicate with and including your own OPFAC.

1. ATCCS Alias. Also known as the R/O Name or the ACCS Alias, the ATCCS Alias is often used within a message to reference another unit. It is also used at the beginning of the message in the header to tell the receiving unit who the message is from and who it is to. The alias is entered in the Master Unit List as a 33-character name of seven fields of 4, 9, 2, 5, 5, 5, and 3 characters each.

AAAA	BBBBBBBBB	CC	DDDDD	EEEEE	FFFFF	GGG

2. Hostname. The unit's hostname is the unit's actual address on the network and is provided as a word, for instance "divarty-1cvd". Although the hostname and the IP address (see below) are used for primarily the same purpose, routing messages to another unit, the hostname is generally more readable and understandable by the operator.

3. Domain: The unit's domain represents the logical placement of the workstation within the LAN architecture. This parameter is required to communicate with other units that use fully qualified domain names on the LAN. A unit's hostname along with the domain represents the fully qualified domain name. If the hostname of a workstation is "divarty-1cvd" and its domain is "army.mil" then the fully qualified domain name is " divarty-1cvd.army.mil".

4. Internet Protocol (IP) Address. The unit's IP address is it's actual address on the network. The IP address is made up of four numbers, or octets, separated by decimal points known as "dots". For instance 149.10.2.3 would be said like "one forty nine dot ten dot two dot three". Generally, the first two octets of the IP address must be the same for all units on the same LAN network.

5. Unit Identification Code (UIC). The unit's UIC is a six character code identifying the unit for service support and supply purposes. UICs are assigned to units of echelon battery and higher, and so would not be provided for platoon cannon or rocket units. The UIC is used in only a few ABCS messages, but, most importantly, is used in the S507 RESOURCE message .

C. Transfer of Location Data. Locations are passed between ABCS systems in a variety of formats: Long and Short UTM, MGRS and Lat/Long. In any of these formats, the location is associated with a Datum. Since no way exists to specify the datum in the message, all ABCS units transmit location information in the WGS-84 datum.

WARNING !!

Since ABCS units can only transmit location data in the WGS 84 Datum, it is extremely important that the AFATDS operator ensure that the Datum listed for any ABCS unit on the Basic Unit Data form for that unit is WGS 84.

IMPORTANT!!

Do not convert coordinate format for locations between grid zones +9 and -9. Coordinate data will be lost after one cycle of the format displays.

D. LAN versus MPN LAN. A LAN is a high-speed data link between computers over a coaxial cable. A LAN link runs at 10,000,000 bps compared to a maximum speed of 16,000 with VMF and 2,400 bps with TACFIRE. All that is required to construct a LAN network are LAN Tees for each computer, two terminators (one at each end of the length of the LAN) and a coaxial cable which is run from one computer to the next.

An MPN LAN, however, is quite different. An MPN LAN is constructed like a LAN but contains an additional device known as a Tactical Name Server (TNS). This TNS is connected via secure radio or wire to other TNS's on separate, unconnected networks and is the Packet part of the Mobile Subscriber Equipment (MSE). The TNS auto-generates IP Addresses for computers on the network and allows two computers separated over a distance to communicate over a LAN-like network. Without the TNS, an MPN LAN network will not operate. In order for a CCU to interface with the MSE SEN, a transceiver to convert 100 Base (RJ45) to 10 Base (BNC) must be used.

E. Communication Configuration. After the above entries are determined for each ABCS unit, the following steps should be performed to establish communications with them.

1. For each ABCS unit including your OPFAC, enter the ATCCS Alias and UIC into the Master Unit List.

2. Next, ensure that each ABCS unit exists in the Current situation and has a Datum of WGS-84. This will allow you to receive messages with locations in them.

3. Ensure the ABCS units are physically on the LAN (or MPN). See Section 1 for instructions on constructing a physical LAN network.

4. Create or modify the LAN network. Enter your OPFAC's hostname and domain, if applicable, on the LAN network window. If the network is not an MPN LAN, enter your OPFACs IP Address as well. On an MPN LAN, the TNS will auto-generate yours and other's IP Addresses.

5. In the Destination Units window, enter all other ABCS units you wish to communicate with. For each, make their route Direct on the LAN network and enter their hostname. If not on an MPN LAN network, enter their IP Addresses as well.

6. Whenever a modification is made to the units on the LAN or MPN LAN network, the network will be disabled.

Communications
EPLRS

A. Overview. EPLRS, or the Enhanced Position Locating Reporting System, is a position locating, navigation, identification, and communications system which allows AFATDS to obtain unit location information and to communicate with other AFATDS OPFACs. EPLRS consists of a net control station (NCS) that establishes and controls a network of individual radio sets (RS), see Figure 25. The RS is also known as an Enhanced PLRS User Unit (EPUU). An RS connects to an AFATDS TCIM via a TCIM-EPLRS interface cable.

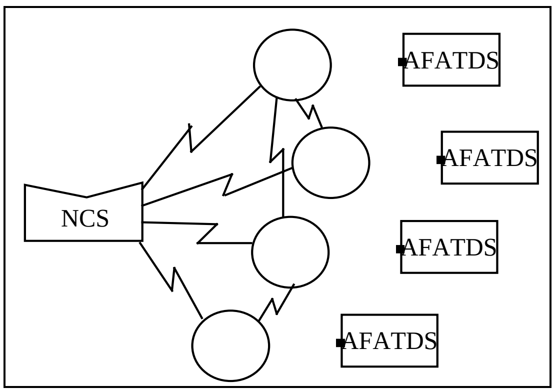


Figure 25. Example of an EPLRS Network.

B. Control and Communications Nets. Communication over EPLRS is provided by a control net and a communications net. The control net provides communications for the NCS and for the user using the user readout (URO). This is mainly used when a user is getting and sending information using the EPUU's URO device. The communications net is what AFATDS actually uses to talk to other AFATDS OPFACs. The NCS is responsible for establishing the communications net between two OPFACs, but once it is established, control by the NCS is not required.

C. Needlines. Communication on the communications net requires that the NCS establish a needline for each and every pair of subscribers who needs to talk to each other. This differs from traditional nets in that a unit does not have a subscriber address, instead, each "combination" of two units who need to talk are given a needline, and the needline is assigned a logical channel number (LCN). This LCN is the "address" which determines what two units will talk. The following illustration, Figure 26, shows an example of four units (A, B, C, and D) who all talk to each other; this requires six different needlines (LCNs of 5, 6, 9, A, 12, and 1C).

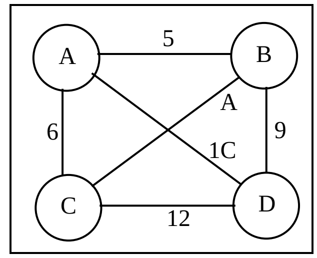


Figure 26. Four OPFACs Require Six Needlines.

D. <u>EPLRS Automatic Routing</u>. Once the needlines for communication are established, EPLRS will automatically attempt to route messages to units which are not within electronic line-of-sight (ELOS). EPLRS does this by relaying each sent message until the destination receives it, then the destination compares all received/routed messages to see which path was the shortest. The shortest path is chosen and the two subscribers communicate over that path. As shown above, this path could be a single needline (e.g., A and C talk over 6) or could be a relayed path (e.g., B and D talk through C over needlines A and 12 because B and D are not within ELOS of each other). An RS will try to send to another RS eight (8) times before the NCS is alerted that it cannot get through.

E. <u>LCN Addresses</u>. The LCN address as given to you by the NCS or shown on the URO is in hexadecimal number form. This is different than the decimal number form used in AFATDS. When the NCS gives out LCNs to use, you will have to convert to decimal before putting the LCN into AFATDS. See Appendix G for a table of hexadecimal to decimal numbers.

F. <u>Configuring EPLRS</u>. Before AFATDS can use an RS for communications, the RS must be configured using the URO. Two actions must take place: the EPUU must be configured to talk to the TCIM ("-L" command) and the needline(s) must be turned ON (".A" command). Turning ON needlines is done automatically by AFATDS when you attempt to communicate over that needline.

The EPUU setup is done by issuing the "-L" command to the EPUU as follows.

1. Enter "-L" in MSG field of URO.
2. Enter host type of "P" in first character of ZONE field. This specifies Army Data Distribution System Interface (ADDSI).

3. Second character of ZONE field should be blank.
4. Enter "CNXI32.0" in EAST/BRG NORTH/RNG field. This specifies
   C - data circuit terminating equipment (DCE)
   N - NRZ format
   X - external transmit clock
   I - internal transmit clock
   32.0 - 32K bps bit rate
5. Press SEND key.
6. MODE field will change to S to indicate the message was sent.

MODE	MSG		MESSAGE DESCRIPTOR							
S	-	L								
QUAL	ZONE		EAST/BRG NORTH/RNG							
	P		C	N	X	I	3	2	.	0

7. When MSG RCVD indicator lights, press RCVD key.
8. MODE field changes to R indicating received message is displayed.
9. The entered parameters are shown as they were stored.

G. AFATDS Setup. When constructing the EPLRS network, ensure that the data rate and encoding match what was entered into the RS with the URO. Specifically,

Data Encoding: NRZ
Data Rate: 32K

Also note that EPLRS can only be assigned to channel ONE of a TCIM. This means that the EPLRS net will have to be assigned to either channel ONE or channel THREE depending on what TCIM it is attached to.

Even though you have set a data rate of 32K bps, the EPLRS communications net operates much more slowly. The 32K bps is the rate at which the TCIM talks to the EPUU. EPUUs talk to each other at or about 640 bps.

H. EPLRS MILID. The EPLRS system uses a subscriber ID called the MILID. This will be given to you by the NCS and will appear as an eight (8) character ID (e.g., FSE-1-12). This MILID should be entered in the Master Unit List for appropriate units.

Communications
MIL-STD 188-220A Communications

A. Overview. Create a 188-20A communications network. 188-220A is a unique communications configuration that uses IP addresses over wire and radio protocols. To initiate the 188-220A network you must either build a planned configuration or add a new network to the current communications configuration.

B. Establish a 188-220A Network.

> **WARNING !!**
>
> **DO NOT select the More button on the 188 220A Information window when establishing a 188-220A network. The More button opens the IP Tuning Parameters window and the optimal values for these parameters are already set as defaults.**

No.	Action
1.	Select "System / Configuration / Communications / Current".
2.	Select "Network / New IP".
3.	Name the Network (e.g., 3BdeCmdFire). This field will hold up to 16 characters, but spaces will not be accepted.
4.	If you are going to be operating in a secure mode then select "secure", if not select "clear".
5.	Adapter will be the TCIM 188-220A selection.
6.	Auto DCE is non-editable.
7.	From: When utilizing the TCIM 188-220A adapter, the manual option will be automatically selected. The operator must then manually input his Local IP address in this window.

No.	Action
8.	Hostname: Each OPFAC will be assigned a unique hostname. The headquarters that controls the unit's master unit list and database should determine this. Examples of hostnames; 3 BDE FSE could be bde3fse, TF 1/10 FSE could be tf110fse, A Btry 2/37 FA could be btrya237fa.
9.	Domain name: This name is necessary if the OPFAC is communicating with a unit that uses fully qualified domain names. If the hostname of a workstation is divarty1cvd and its domain is army.mil then the fully qualified domain name is divarty1cvd.army.mil. While an entry in this field is not usually necessary when communicating between AFATDS OPFAC's, is could be a necessary entry if communicating with other systems (e.g., TBMCS). The unit's communications administrator will supply this information.
10.	Local IP address: This entry is for the Internet Protocol address assigned to your OPFAC. The IP address consists of 4 number groups (e.g., 94.12.8.14). The unit's communications administrator will supply this information.
11.	Subnet Address Mask: The subnet mask tells AFATDS what portion of the IP address is the network address and what portion is the host address. Package 11 devices operate using a 255.255.0.0 class B subnet. AFATDS will default to this subnet if the first octet of the local IP address is 128 or above. If the subet defaults to anything other than 255.255.0.0 then the legacy device will probably not accept that address.
12.	Router Name: If a router is being utilized the hostname goes here.
13.	Router IP Address: If a router is being utilized the IP address goes here.
14.	Select Next.
15.	Local Physical Address, entries can be numbers between 4-95.
16.	Device: Select SINCGARS, 2 wire, 4 wire, Analog radio or KY 57.
17.	Local Transmission Load: Normal
18.	Data Encoding: (Appendix C, Supporting Comm Settings, lists all valid 188-220A network combinations of protocols, media, encoding methods and baud rates.)

No.	Action
19.	Comsec Mode: Plain Text, Cipher text or Time Delay.
20.	Data Rate: Depends on the Media Device used and the Data Encoding method selected (refer to Appendix C, Supporting Comm Settings).
21.	Hop Mode: Depends on radio setup (single channel / frequency hopping).
22.	Media Access control parameters: Method; Random, Prioritized, Hybrid, DAP or Adaptive.
23.	Stations: this is the number of stations that will be on the entire network.
24.	Frequency of Access Ranking: this entry would be for your OPFAC. What number are You? The communications administrator will supply this data.
25.	Do Not select "More".
26.	Select OK to save and close the window.

C. 188-220A Network Troubleshooting Flow Chart. If a 188-220A Network is not working, the following LAN Network Troubleshooting Flow Chart provides an aid in determining why a 188-220A Network is not working.

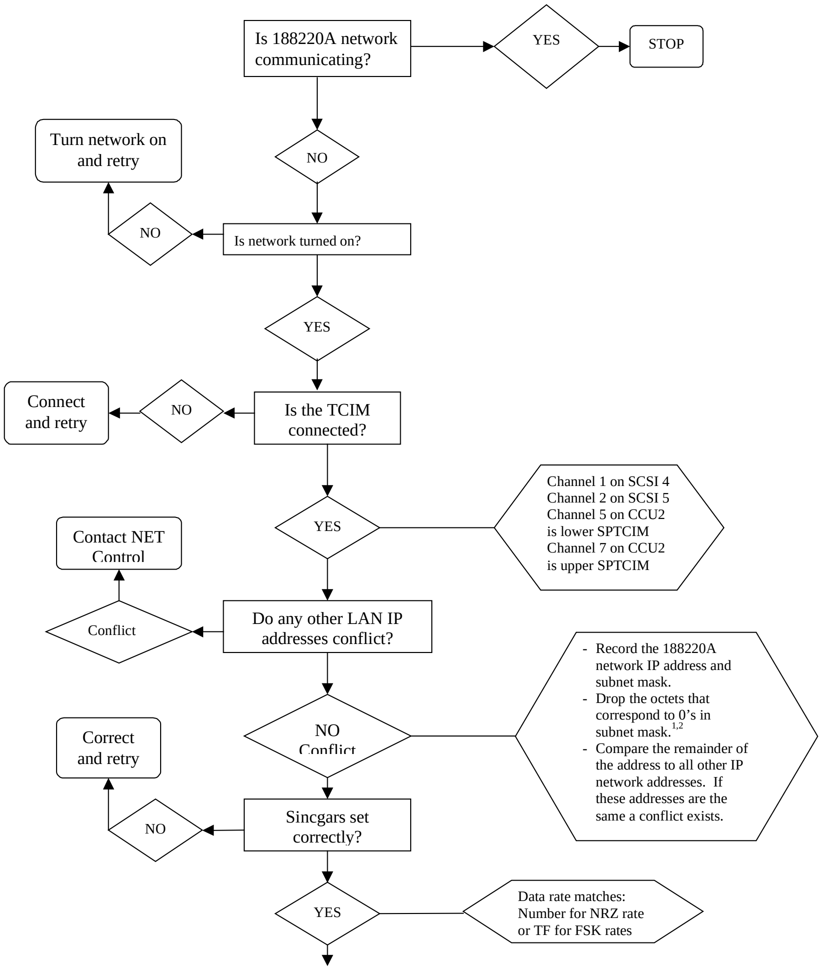
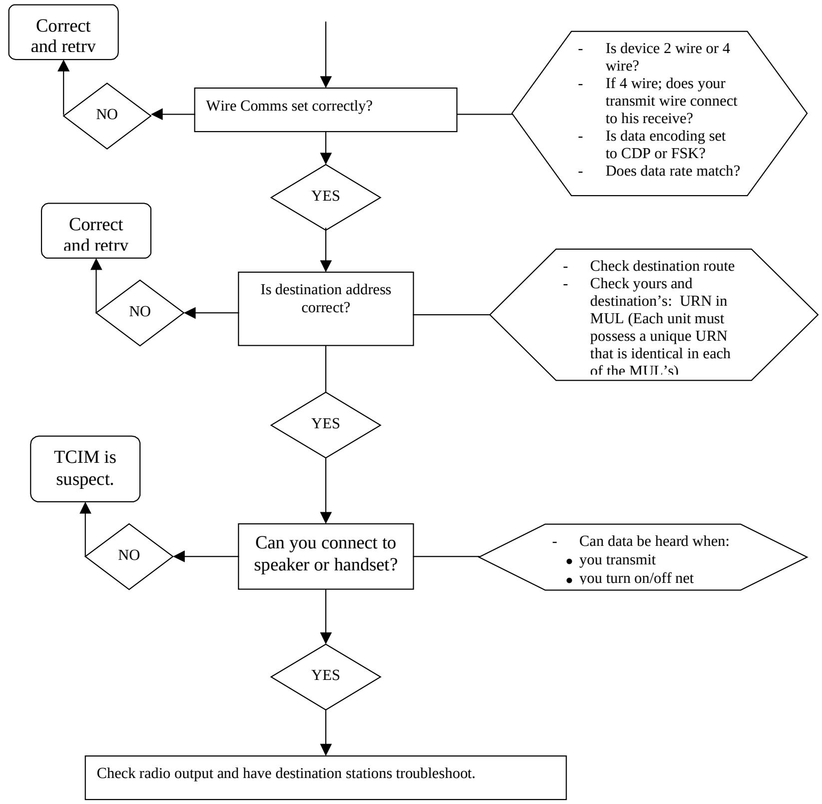


Figure 27. 188-220A Network Troubleshooting Flow Chart
(1 of 2)



Notes:

1. Package 11 devices operate using a 255.255.0.0 Class B subnet. AFATDS will default the subnet when the address is entered. If the subnet defaults to anything other than 255.255.0.0 then legacy devices will probably not accept that address. Every Package 11 devices will not receive all Package 11 messages.
2. Last octet range is 4-95 **only**. If a correct Local IP address option is entered, an attempt it made to auto-fill the Local Physical Address. However if the Physical Address cannot be automatically determined (from the host portion of the IP address), an error message indicates that the Physical Address can be entered on the Next screen.

Figure 27. 188-220A Network Troubleshooting Flow Chart
(2 of 2)

Communications
CTAPS/TBMCS Communications

A. Overview. Both CTAPS, the Contingency Theater Automated Planning System, and TBMCS, the Theater Battle Management Core System, assists the Air Operations Center of the Joint Task Force in managing air assets in support of ground forces. AFATDS communicates with these systems over LAN connections using the USMTF messages. AFATDS can only communicate with one CTAPS or TBMCS destination unit at a time.

B. CTAPS/TBMCS Basics. For correct CTAPS/TBMCS communications to take place, the following needs to be determined for the CTAPS/TBMCS unit you will communicate with and including your own OPFAC.

1. Hostname. The unit's hostname is the unit's actual address on the network and is provided as a word, for instance "divarty-1cvd". Although the hostname and the IP address (see below) are used for primarily the same purpose, routing messages to another unit, the hostname is generally more readable and understandable by the operator.

2. Domain: The unit's domain represents the logical placement of the workstation within the LAN architecture. This parameter is required to communicate with other units that use fully qualified domain names on the LAN. A unit's hostname along with the domain represents the fully qualified domain name. If the hostname of a workstation is "divarty-1cvd" and its domain is "army.mil" then the fully qualified domain name is " divarty-1cvd.army.mil".

3. Internet Protocol (IP) Address. The unit's IP address is it's actual address on the network. The IP address is made up of four numbers, or octets, separated by decimal points known as "dots". For instance 149.10.2.3 would be said like "one forty nine dot ten dot two dot three". Generally, the first two octets of the IP address must be the same for all units on the same LAN network (See the section titled "LAN Communications").

4. User ID. The User ID reflects who is going to receive the USMTF message on the workstation. The AFATDS unit will always receive messages from CTAPS and TBMCS using the "afatds" User ID (e.g. afatds@hostname). The User ID for the destination CTAPS unit is

usually "ctaps" and for the destination TBMCS unit is usually "BROKER." User ID's for the TBMCS and CTAPS units are changeable using the Edit Routes window.

C. Communication Configuration. After the above entries are determined for the CTAPS/TBMCS unit, the following steps should be performed to establish communications with them.

1. Ensure the CTAPS/TBMCS unit is physically on the LAN. See Section 1 for instructions on constructing a physical LAN network.

2. Create or modify the LAN network. Enter your OPFAC's hostname, IP Address, and domain, if applicable, on the LAN network window.

3. In the Destination Units window, enter the CTAPS/TBMCS unit you wish to communicate with. Make its route Direct on the LAN network and enter the hostname, IP Addresses, and User ID.

D. Verify Connectivity. To verify that AFATDS and CTAPS are communicating, use the "Ping" function (click center mouse button on desktop background). When the ping window opens type "ping hostname" (the "hostname" is the host name you previously entered for the CTAPS device). You may also type "ping 151.105..." (the numbers are the IP address you previously entered for the CTAPS device). A successful ping will display text like "ctaps02 is alive" (the word your looking for is "alive").

IMPORTANT!!

If you later make any changes to the "Edit Routes" window for the CTAPS' unit, you must turn the CTAPS/TBMCS network "Off" (disable) and then back "On" (enable) in order for the changes to take effect.

Communications
JMCIS/TCO

AFATDS interfaces with the Intel/Operations Station (IOS). This interface allows the AFATDS to pass unit data and geometries to IOS and allows IOS to pass unit data (called tracks in these systems) and geometries (referred to as overlays) to AFATDS. This interface causes the AFATDS computer to function as a client of the TCO/GCCS-M Track Database Manager (TDBM). AFATDS uses a proxy server to support this interface. The proxy server resides on the TCO (Tactical Combat Operations) computer (now referred to as IOS) and is embedded in the AFATDS software load. The proxy server accesses the TDBM and passes track and geometry data to the proxy server at AFATDS. AFATDS is able to access the track database and geometry from its proxy server. Hereafter, this interface is referred to as the JMCIS interface.

NOTE!

The proxy server segment must be loaded on the IOS. USMC IOS loads automatically possess this server. USN GCCS-M does not incorporate this server segment.

A. Workstation LAN configuration. The JMCIS interface may be established on either the internal or external LAN of the UCU or CCU workstations.

B. Establish JMCIS interface. To establish the JMCIS interface the following information must be determined prior to computer setup.

1. Determine which network interface (internal or external) will be used to communicate with IOS. Determine the IP addresses and hostnames for these networks for both the IOS and AFATDS workstations.

    a. If the interface is to operate on the internal LAN, the address and hostname of the internal LAN must be established during the software load process.

b. If the interface is to be established on the external LAN, the address of the AFATDS workstation is defined on the Current Networks window as for any external LAN setup.

C. Setup the AFATDS workstation as a client. The following steps describe the setup of the AFATDS workstation as a client.

Table 7. AFATDS WORKSTATION

Step	Action	Result
1.	Boot the AFATDS workstation.	The COE login window displays.
2.	Log in.	Login as afatds1 and password afatds.
3.	Add the IOS unit to the master unit list. Click System | Administration | Master Unit List.	The Master Unit List window displays.
4.	Click New.	The Edit Unit window displays.
5.	Make the following entrees: Unit ID Unit Number System Type: JMCIS JMCIS Alias	When editing is complete OK the window and the Master Unit List window.
6.	Add the JMCIS unit (representing the TCO/GCCS-M unit) to the current situation. Build the unit as an Other type unit. The unit symbol can be an NGF unit and service: Navy or a Unit of any type. Command support relationships can be created as required.	The unit appears in the current situation.

D. Exchange unit data with IOS.

1. IOS can store world wide unit tracks. It may not be operationally desirable to receive every one of these tracks at AFATDS. Likewise, IOS may not require data on every unit in the AFATDS database. A filtering mechanism (explained below) and master unit list entries are required to exchange specific units. This mechanism serves to allow the AFATDS operator to limit the units for which data are exchanged and prevents unit duplication (several different representations of the same unit) from being passed to IOS.

2. To exchange unit data with IOS, the following requirements must be met.

   a. Filters are established during setup of the JMCIS Interface window (described in Table 8 below). These filters examine Service of the unit data and exchanges only those of the types indicated in the JMCIS Interface window.

   b. The JMCIS Interface window also controls the directions of information flow. The selections for each service type unit are To JMCIS and From JMCIS. Checking the associated buttons direct the interface to accept and/or send data to JMCIS. It should be noted that checking both “To JMCIS” and “From JMCIS” buttons does not cause an unending, circular "pinging" of this data.

   c. Lastly, each unit for which data will be exchanged must have an entry in the JMCIS ALIAS of that unit’s Master Unit List window. Two rules apply.

      1). If the unit in question is a Naval Unit (a platform track in IOS), the JMCIS ALIAS must be written in the form Ship Class Name-Ship Name. (The "-" is allowed in the JMCIS alias only as a separator between ship class and ship name and cannot be used elsewhere in the JMCIS ALIAS.). The hull type and hull number must also be entered in these fields of the Master Unit List window. For example, LHD-6 USS Bonhomme Richard of the USS WASP class is entered as WASP-Bonhomme Richard in the JMCIS ALIAS field with a hull type and number of LHD and 6, respectively. It is imperative that the JMCIS ALIAS exactly match the track name (not Short Name) as it is entered in the IOS database.

      2). If the unit in question is a ground unit, the unit name is entered in the JMCIS ALIAS and nothing is entered in the hull type and hull number. Again, if the unit data originates from IOS, the JMCIS ALIAS must exactly match the track name (not SHORT NAME) as it is entered in the IOS database. No special characters (/, -, etc) may be used in the alias.

      3). Incomplete unit data will be ignored by AFATDS. The track must possess a name, a location, service, threat and type (surface, etc). Ships must also possess a class name and hull type and number. Air tracks are not translated into the AFATDS database and subsurface tracks are created as NGF units.

4). It is suggested that each USMC unit contributing tracks to IOS enter JMCIS ALIASES only for itself and its subordinates that do not report directly to IOS. This will prevent multiple track IDs for the same unit being passed from one IOS to another.

3. Unit data may be transmitted individually by selecting the unit symbol on the AFATDS Current window and using the right button pop-up menu to Send Status to the JMCIS distribution list on the Send To window.

4. The exchange of unit data can be re-initiated after the steps in Table 8 have been executed This is accomplished by displaying the JMCIS Interface window (Situations | JMICS Interface) and clicking all From JMCIS and To JMCIS buttons off and closing the window by clicking OK. Re-open the window and click the desired buttons and OK the window again. These actions cause AFATDS to disregard previous data exchanged and re-send all data. This may be required if additional units are added to the AFATDS data base after the unit data exchange was initiated.

5. To create a unit in AFATDS, a minimum set of data is required. If the track lacks this information, it will not create a unit in AFATDS and will produce a medium level alert indicating the failure. The IOS track must possess the following entries:

a. Platform Track.

1). Name, matching the AFATDS JMCIS alias.
2). Location, assumed to be WGS 84 reference by AFATDS
3). Class, matching the JMCIS alias.
4). Category, NAV or SUB
5). Threat, Friend, Hostile or Neutral
6). Hull Type, matching the MUL entry
7). Hull Number, matching the MUL entry

b. Unit Track.

1). Name, matching the AFATDS JMCIS alias
2). Organization Type
3). Service
4). Threat
5). Platform

6. Finally, both AFATDS and IOS must be time synchronized to allow the exchange of data.

Table 8. Turn on JMCIS Interface and Exchange Unit Data		
Step	Action	Result
1.	Click Situations	A pulldown menu is displayed.
2.	Click JMCIS Interface	The JMCIS Interface window is displayed.
3.	Click the From JMCIS and To JMCIS buttons corresponding to the unit types that will be exchanged.	The buttons depress.
4.	Click the Internet Address field.	Type the IP address of the IOS.
5.	Click the JMCIS Interface field.	A pulldown menu appears.
6.	Click Select.	A list of JMCIS system type units is displayed.
7.	Click on the IOS unit and select OK.	The selected unit displays as the JMCIS Interface unit.
8.	Click the OK button.	The window closes and the interface exchanges unit data.

E. Transmit AFATDS geometry to IOS. An AFATDS geometry is transmitted to IOS by transferring the current plan. Both friendly and enemy geometries can be transmitted. When these are received at IOS, the geometries create an “Overlay.” It should be noted that overlays in IOS are composed of individual lines, circles, rectangles, etc. These do not have associated operational rules as do FSCMs in AFATDS. When IOS sends overlays into AFATDS, AFATDS interprets each line or area as a general geometry. The receiving AFATDS operator must recreate these as the appropriate measure and transmit the correct geometry type via data distribution.

Table 9. Transmit AFATDS Geometry to IOS		
Step	Action	Result
1.	Click Situations on the AFATDS main menu bar.	A pulldown menu is displayed.
2.	Click Transfer Current.	The Transfer Current window is displayed.
3.	Click the Comm button.	The Button depresses.
4.	Click Information Type: Geometries.	The list on the right displays Enemy and Friendly.
5.	Click Friendly.	The list on the right displays geometry types.
6.	Click all the type buttons.	The buttons depress.
7.	Repeat steps 5 and 6 for Enemy units.	The buttons depress.
8.	Click Send.	The Send To window is displayed.

Table 9. Transmit AFATDS Geometry to IOS		
Step	Action	Result
9.	Click JMCIS in the lower list and click OK.	The AFATDS geometries are sent to the IOS unit as an overlay.

Communications
Jamming and Interference

Jamming and electromagnetic interference can reduce the probability of successful message transfer with AFATDS as they do all other devices. This is because jamming and interference cause signals that look like data to be present on those frequencies which the radio uses. The degree of interference can be measured with special equipment and is known as the bit error rate (BER). The BER is the number of data bits in error per number of bits sent. The BER increases as the proximity or strength of the interference signal increases. As the BER increases, the success rate of message transmission decreases.

By use of different communication protocols and media, the success rate of message transmission can be substantially increased in some cases.

A. <u>Protocols</u>. Protocols supported by AFATDS all contain forward error correction (FEC). FEC allows the computer to find and correct a limited number of errors in the data received.

TACFIRE, ADLER and NATO protocols are all very similar and use a FEC method called "hamming". The hamming method can correct about 1 error in every 12 bits sent. It also uses a transmission technique known as time dispersed coding (TDC) which reduces the effect of short bursts of interference in the signal.

The VMF and 188-220A protocols, on the other hand, uses a FEC method called GOLAY coding. The GOLAY method can correct about 3 in every 23 bits of data. It also uses the TDC method of transmission. Note that in AFATDS, the FEC can be turned off for VMF and 188-220A. By turning FEC off for VMF and 188-220A, no error correction will be done but the data will take about half as long to transmit.

The EPLRS protocol can only be used when communicating over EPLRS. EPLRS is considered to "provide secure, jam-resistant digital communications... for the user." (TM 11-5825-283-10, p. 1-3). Limited tests using AFATDS over EPLRS have shown that high levels of jamming do not degrade communications.

B. <u>Media</u>. The different media devices supported by AFATDS have differing levels of error correction built in. Simple radios like the PRC-77 have no error correction. All error correction would need to be done by the protocol (see above). SINCGARS and EPLRS provide the best point-to-point digital communications over radio. Wireline and LAN networks are virtually immune to interference although wire and LAN cables should be kept away from high energy sources (e.g., generators, high voltage power cables and lines, power amplifiers, etc.).

SINCGARS radio provides a relatively reliable digital data link. As the data rate decreases, the chance that data will get through a jammed net increases dramatically. Testing has shown that even at the highest doctrinally anticipated levels of jamming, almost 100% of messages succeed at 1200 bps using VMF protocol over SINCGARS. At low- and mid-level jamming most all messages succeed at 2400 bps.

As stated above, the EPLRS radio and protocol provides a highly jam-resistant communications path. The drawback of this highly reliable network is a lower transmission data rate than experienced with SINCGARS and other radios. The EPLRS auto-routing feature counters this drawback, however, as it allows units to establish comm links with other units not within ELOS.

Communications
E-mail Via Netscape

The AFATDS 99 software version is provided with Netscape Navigator 4.72 for use as a medium for exchanging E-mail.

A. Opening Netscape Navigator.

No.	Action
1.	Netscape Navigator is opened by selecting Messages from the AFATDS menu bar.
2.	Select Netscape from the pull down that is displayed. The Netscape Navigator 4.72 window is displayed.

NOTE!

At this point Netscape may display an error message indicating the server cannot be located and that some hosts may be unreachable. These result from incorrect setup of the home location and server information or indicate that the external LAN is not turned on or cannot connect to the server. OK these alerts and correct communications or setup of Netscape.

B. Setting Up E-mail Parameters.

1. Required data. What data you require will depend upon your E-mail system. You may use a mail server or communicate your mail directly to other computers.

    a. If you use a mail server you will need the following information:

        Your E-mail address.
        The mail server's E-mail address.
        The type of service provided by the server.
        Your password for accessing the mail server.

b. If you communicate directly to other computers for E-mail, prior to setting up Netscape you must determine the hostname you will use for external LAN communications. To use Netscape you must also have a LAN network built (with either a real or fictitious CTAPS/TBMCS destination unit) and the network must be enabled to send and receive mail.

2. User Identity. By setting up the identity of your computer you tell the mail system who you are.

No.	Action
1.	Left click on Edit. A pull down menu is displayed.
2.	From the pull down, select Preferences. This selection displays the Netscape Preferences window.
3.	On the left side of the Netscape Preferences window is an expandable list of options. Locate Mail & Newsgroups and left click on the left pointing arrow before the word Mail & Newsgroups. This causes the arrow to point down and expands the Mail & Newsgroups section to show additional selections in this category.
4.	Left click on Identity under the Mail & Newsgroups selection.
5.	Your Name is the name provided to the recipients of your mail. In other words, what you enter here becomes your identity on the received message when it is viewed at the destination.
6.	E-mail Address is your complete E-mail address. If you are using a mail server, use the E-mail address as defined by your system administrator. E-mail addresses will be something like operator@ hostname. Where operator is the logon name and the hostname represents the name entered in the hostname field of the configured IP/LAN network followed by a (.) dot. Ex: operator@fsemain. or operator@fse3bde. You must add a period to the end of the hostname when you enter the E-mail address.
7.	Reply to Address provides an address for replies to your messages. Enter the same as Number 6 without the (.) dot at the end of the hostname.
8.	Organization allows the entry of the unit to which you belong.
9.	Signature File is the path to the file that contains your signature. This is an optional entry that provides a meaningless default value. This entry allows you to access a file containing a copy of your signature for inclusion on messages. Allow this to default.

No.	Action
10.	After completing the Identity information, select OK to store the information and close the window. The Netscape: Untitled window is displayed.

3. Set Initial Window. The following procedure sets the Netscape Mail and Discussions window to be the initial window to open when you select Netscape. This saves several steps in getting to the Netscape Mail and Discussions window.

No.	Action
1.	Left click on Edit. A pull down menu is displayed.
2.	From the pull down, select Preferences. This selection displays the Netscape Preferences window.
3.	On the left side of the Netscape Preferences window is an expandable list of options. Locate Appearance and left click on the left pointing arrow before the word Appearance. This causes a set of Appearance selections to appear on the right side of the window.
4.	Left click on the Messenger Mailbox. Do not make any other selections on this window.
5.	Select OK to store the information and close the window. The Netscape: Untitled window is displayed.

4. Messages, Copies and Folders, Formatting Return Receipts and Disk Space. These are selections for handling messages at your computer.

No.	Action
1.	On the Netscape Menu bar click on Edit and from the pulldown menu select Preferences. On the left side of the Netscape Preferences window is an expandable list of options. Locate Mail & Newsgroups and left click on the left pointing arrow before the word Mail & Newsgroups. This causes the arrow to point down and expands the Mail & Newsgroups section to show additional selections in this category.
2.	Left click Messages. The following data may be edited.

No.	Action
2a.	For Forwarding messages use the default, forward messages INLINE selection and automatically quote original message when replying. This option, when selected, provides a reference to the original message when a reply is made.
2b.	Wrap long lines at [72] characters. This selection allows the operator to determine where in a message the text will “wrap around” to begin a new line. This may be adjusted for ease in reading messages. The default is 72 characters per line and may be changed by highlighting and typing over this value. The third setting on this window is ‘Send’ messages that use an 8 bit characters and use the ‘As is ‘selection. Save the entries by clicking OK. From the Netscape window select Edit, Preferences to re-open the Preference window and select Copies and Folders.
2c.	Copies and Folders set where messages are placed. Check the two selections, ‘Place a copy in folder ‘Sent’ on “Local Mail”.’ For Drafts or Templates select where you wish to store these items. Save the entries by clicking OK. From the Netscape window select Edit, Preferences to re-open the Preference window and select Formatting.
2d.	By default, send rich text (HTML) format message. This is the default value. Only change this if directed by the system administrator. Save the entries by clicking OK. From the Netscape window select Edit, Preferences to re-open the Preference window. Allow the remaining selections of Return Receipts and Disk Space to use their default settings.
2e.	Select OK to store the information and close the window. The Netscape : Untitled window is displayed.

5. Mail Server Type. The selections available through the mail server window are: Movemail, IMAP (Internet Access Protocol) and POP (Post Office Protocol). Mail sever setup applies to mail systems that use a mail server to control E-mail operations and for systems that send directly to each other. If you send your mail directly to the recipient as in AFATDS to AFATDS use the Move Mail selection. Mail server type is very important in that it defines the address and source of mail services. Two categories of information are entered. These are the mail server address information and the mail server type.

No.	Action
1.	On the Menu bar left click on Edit and from the pulldown menu selection, select Preferences. On the left side of the Netscape Preferences window is an expandable list of options. Locate Mail & Newsgroups and left click the left pointing arrow before the word Mail & Newsgroups. This causes the arrow to point down and expands the Mail & Newsgroups section to show additional selections in this category.
2.	Left click Mail Server. The following data must be entered.
2a	Mail Server provides addresses to access the mail server.
2a(1).	- Mail Server User name is the user name of the mail server. This information is provided by the system administrator.
2a(2).	- Incoming Mail Server is the source to which your computer looks to find your mail. The complete address of the server should be entered as provided by the system administrator.
2a(3).	- Outgoing Mail (SMTP) Server is the sendmail server that routes your outgoing mail. The complete address of the server should be entered as provided by the system administrator.
2b.	Mail Server Type provides three options. These must match the type of mail service provided. Again, check with the system administrator before making or changing entries. The selections are:
2b(1)	- POP (Messages and folders are kept locally on your hard disk drive). This is the default selection. Copies of messages and storage locations (inbox, outgoing message, etc.) are on your hard disk drive.
2b(2)	- Move Mail Application defaults to Built in, but allows the operator to define an External Application. The move Mail setting can be used to send mail from AFATDS to AFATDS.
2b(3).	- IMAP (Messages and folders are kept remotely on server) When selected, this causes your computer to expect the server to hold all messages and files for your access. This option allows additional definition of tasks. These are found by looking at IMAP properties by clicking the upper tab labeled IMAP.
2b(3)(a).	With the Mail Server Properties window is open click the radio button to ‘Move deleted messages into trash.

No.	Action
2b(3)(b)	Server support encrypt communications (SSL). Use the default value of blank (unchecked). Select Ok to store the information, and the Netscape window is displayed.

C. Setting Up the Address Book. The address book provides a reference list of individuals and mailing lists (of individuals) to ease addressing messages that you compose. This list is maintained by the user and can be updated at any time.

1. Accessing the Address Book.

No.	Action
1.	With the Netscape window displayed, select Communicator from the main menu bar. A pull down menu is displayed.
2.	From the pull down, select Address Book. The Communicator Address Book for AFATDS is displayed.

2. Adding an Individual Addressee to the Address Book.

No.	Action
1.	With the Communicator Address Book for AFATDS displayed, left click the New Card icon. This displays a window with three tabs labeled Name, Content and Conferencing.
2.	Name Tab displays the minimum required entries.
2a.	- First Name: the addressee's first name.
2b.	- Last Name the addressee's last name. First and last names will be displayed in the address book to reference this New Card data and is used in messages as the destination.
2c.	- Display name is automatically filled based on entries to the first and last name fields.

No.	Action
2d.	- E-Mail: E-mail Address is your complete E-mail address. If you are using a mail server, use the E-mail address as defined by your system administrator. If you are communicating directly to other computers, this will be similar to afatds@hostname. Where in our sample address afatds is the user name you login with and hostname is the host name you entered in the AFATDS communications configuration for your LAN network. No period is required at the end of the hostname as it was in the Identity window.
2e.	- Nickname: this is an abbreviated name that can be used as a shortcut when addressing mail. This is not required but is recommended. Below the nickname field are some optional entries for the addressee's organization, title, department, an area for notes and a check block located at the bottom of the form to indicate the HTML preferences.
2f.	- Notes: provides free text data entry that is stored but not used by E-mail.
3.	Contact Tab contains street address and phone number information that provides storage for additional information related to the addressee but not used in E-mail.
4.	Netscape Conference provides group conference setup.
5.	When editing is complete, select OK on the New Card window, then select File and Close to close the window or file and EXIT to close and exit Netscape.

3. Adding a List to the Address Book.

No.	Action
1.	With the Communicator Address Book for AFATDS displayed (see step 1 above to display the address book), left click the New List icon. This displays a form named Mailing List.
2.	Create the list by making the following entries:
2a.	- List Name : type a unique name for the list. This will be the name referenced in the addressee listing of your address book.
2b.	- List Nickname : is an optional entry that provides a shortcut for addressing messages to the list.

No.	Action
2c.	- Type the name of each member of the list. These must already exist in the address book. You may also drag a copy of the addressee into the list from the Communicator Address Book for AFATDS window.
3.	When editing is complete, select OK on the form , then select file and CLOSE to close the window or file and EXIT to close and exit Netscape.

D. Sending Mail. To create and send mail, perform the following steps.

No.	Action
1.	After starting Netscape, select communicator from the main menu. A pulldown menu is displayed, select Messenger. Once the Netscape Mail and Newsgroups window is displayed select Message from the menu and a pulldown menu is displayed.
2.	Select NEW Message. The Compose window is displayed.
3.	Compose the message by making the following entries:
3a.	To: Type the address, or nickname from the address book, of the destination. You can also address messages using the address book by double clicking the Address icon. The address book is display. Double clicking will add addressees or lists to the message.
3b.	CC: This field provides space for additional addressees to whom you wish to send the message. After addressing the TO field click the down arrow to the right of To and select CC to access this entry.
3c.	Subject: The subject is a brief description of the message that will be displayed to the addressee when he looks at his inbox. Type a brief description of the message content.
3d.	The body of the message is composed in the lower portion of the Compose windows. Above the text area is a number of icons that assist in text editing. These are:
3d(1).	- Normal pull down list. This list provides a series of selectable paragraph styles and headings that can be used in creating the message. The default is Normal.
3d(2).	- Variable Width list. Fonts may be changed by clicking on this list and selecting from the pull down menu.

No.	Action
3d(3).	- +0 list. This displays the current font size and allows selection of the font to be used in the message.
3d(4).	- Bold Text is a bold "A". Selection of this icon causes typed text to display in bold print.
3d(5).	- Italics Text is an italics "A". Selecting this icon causes typed text to display in italics print.
3d(6).	- Underlined Text is an underlined "A" and causes typed test to be underlined.
3d(7).	- Remove All Styles is a partially erased "A" and returns the text to Normal style.
3d(8).	- Bullets icon provides a bullet format for text.
3d(9).	- Number List icon provides a self numbering list similar to bullets but using numbers.
3d(10).	- Indentation icon enables indentation in the text.
4.	After addressing and editing the message, send the message by clicking on the Send Icon.

E. Receiving Mail. Received mail can be accessed and viewed using the following steps.

No.	Action
1.	After starting Netscape, select Communicator from the main menu. A pulldown menu is displayed, select Messenger. The Netscape Mail & Newsgroups window is displayed and contains your In Box folder icon listed in the Local Mail Folder. Additional folders exist for Unseen messages, Drafts, Templates, Sent and Trash.
2.	The Inbox display lists the Subject, Sender, Date and Priority of each message in columns to the right of the message. Any message can be accessed by double clicking on the message.
3.	Your new mail can be accessed from the server by clicking on the Get Msg icon. This will display a prompt requesting your password for the mail server. Type the password provided by your system administrator and click OK. This will cause the server to download any new messages.

No.	Action
4.	To close the inbox window, click file, CLOSE or to exit Netscape, click file, EXIT.

Communications Troubleshooting

Many troubleshooting techniques exist, and in time you will probably develop some of your own. After checking for valid net addresses, radio key times and observer numbers, it is often useful to listen to the network's audio to determine whether messages are being sent on the net and whether they are being acknowledged by another OPFAC. This can be done with a speaker box on two-wire nets or with the radio speaker on radio nets. On LAN nets, audio monitoring cannot be accomplished. The following are two possible solutions to a non-operational network.

Symptom	Potential Problem
When attempting to Select a New Current configuration, it will not allow one to be selected.	1) <u>Your unit is entered as a destination unit in the configuration you are attempting to select</u>. Close the Current Networks window and then edit the Planned Configuration. Look at the Destination Units and if your unit is present, remove it. Close the Planned Configuration out and attempt to Select New Current in the Current Networks window again.
When attempting to turn On current networks, one or more networks cannot be turned on.	1) <u>A channel is not assigned to the network</u>. Select "Networks | Assign Channels" and verify that the networks which should have assigned channels do. You can only enable networks which have been assigned channels.

Symptom	Potential Problem
	2) The TCIM (if a TCIM net) is not powered on or not functioning properly. Verify that the TCIM power switch is ON. Open the Unit Configuration by selecting "System "| Configuration | Unit" and view the status of the TCIM. Check for a disconnected TCIM cable or lack of a TCIM SCSI terminator. If any hardware problems are found, power down all equipment including the TCIM(s) and fix it, then restart and try again. This may require swapping out the TCIM or SCSI cable for a known working one to troubleshoot the situation.
	3) ON a CCU-2, the SP-TCIMs are not available. Verify that you did not exit the AFATDS application and not reboot the computer.
	4) The LAN (if a LAN net) is not functioning properly. Verify that the external LAN (with the Thin MAU box) is connected and terminated properly (see System Initialization: Hardware Setup"). If it is not terminated correctly, turn off affected machines, terminate and restart. The computer will permanently turn off the LAN if it is not terminated properly when started up. This may require swapping in a known good LAN cable or Thin MAU box out for troubleshooting.
	5) The LAN Card is defective. Open the Unit Configuration window and look at the LAN Card ID. If it is "00000000", this means that the LAN Card ID is bad. Replace the UCU/CCU.
Test Message does not succeed.	1) Destination unit is not fully operational. Ensure that the destination unit is operational and has current networks turned on.

Symptom	Potential Problem
	2) Ensure that addresses match completely between you and the destination unit as well as observer numbers, unit numbers, TACFIRE aliases, etc. where applicable.
	3) Serialization was incorrect. If the test message was to a TACFIRE device type (BCS, IFSAS, etc.) the first test message may fail if the serial number does not match what the device expected. Try another test message (AFATDS will automatically synchronize serial numbers when it gets the first failed transmission).
	4) There are physical problems with the network. a. A wireline net could have shorted or disconnected wires -- check are wires or check with multimeter. b. a radio net might be on the wrong frequencies or have the wrong hop sets entered or selected -- verify all freq.'s/hop sets and do voice check. c. the LAN may not be terminated properly -- check all LAN connections and terminate properly. d. You could be experiencing radio interference or jamming -- attempt to establish using voice. e. you may be outside electronic line of sight of the destination -- attempt to relay. f. you may have grounding problems -- ensure all equipment, including UPS, is grounded.

Symptom	Potential Problem
	5) Too much traffic on the network. The test message will time out if no response has been given. If the network is extremely busy, the test message could fail due to a long wait in getting on the net.
	6) Network is setup incorrectly. Go to the Edit Network window for that Network and verify the settings. Check for 2-wire vs. Local Radio, data rate, data encoding, etc.
Test Message succeeds but other messages do not.	1) Unit is a non-AFATDS device and is not in Current. For non-AFATDS devices, the unit must be entered into the Current situation in order to be able to talk to it. This is because the Datum for the unit must be known in order to talk to it.
	2) Alias is not set up correctly. If trying to communicate with TACFIRE or other device, ensure that the appropriate alias is entered correctly in the Master Unit List.
	3) Software Failure. There may have been a software error. May require restarting of workstation or OPFAC.
When a message is sent to a non-AFATDS unit, a NAK (Negative Acknowledgment) is received back.	1) Serialization is set wrong. The unit has received the message and is sending a NAK in response. The serialization between your box and the other unit is set wrong. Send another test message. AFATDS should have corrected the problem automatically.
From a FED, the address appears to be set correctly but no messages get through.	1) The FED Address on the FED is set in-correctly. On the FED there is a Local Address and a FED Address. The FED Address is the address which should match the address entered into AFATDS.

Symptom	Potential Problem
Targets, Geometries and Unit Locations sent from non-AFATDS devices are not in the locations that they should be.	1) Map Mod is not set correctly. Select “Map Mod/Datum” and check the Map Mod. When a device which uses short coordinates to transmit data (e.g. DMD, FED, etc.) sends us information, AFATDS will find that coordinate inside the map mod and place it there.
	2) Datum for the non-AFATDS unit is not set correctly. Edit the data for the unit which is sending the updates. Set the Datum for that unit correctly. Generally an incorrect Datum will only produce errors of a few hundred meters.
	3) Datum for viewing map and unit data is not set correctly, although the unit’s location is correct in the datum being viewed. Select “Map Mod/Datum” and check the Datum setting.

Resetting the TCIM. If a net stops operating for no apparent reason, it may be helpful to disable that net and then enable it again. This will reset the TCIM(s) automatically.

1. Open the "Current Networks" window by selecting "System | Configuration | Communications | Current".
2. Select the inoperative net and then select "Networks | Off".
3. Wait until the net shows a status of "Disabled" and then select "Networks | On".
4. Attempt to use the net again.

If this does not succeed, it may be useful to turn the networks off and then cycle power on the TCIM which the net is operating on. Perform the following steps.

WARNING!!

This can be dangerous because a small chance exists that the machine will encounter an error when powering on the TCIM.

1. Open the "Current Networks" window by selecting "System | Configuration | Communications | Current".
2. Select "Networks | All Off" to turn all networks off.
3. Wait until the net shows a status of "Disabled".
4. Open the "Unit Configuration" window by selecting "System | Configuration | Unit".
5. Turn power off to the TCIM in question.
6. Select "Options | Refresh" until the TCIM shows status of "Failed" or "Not Present".
7. Turn on power to the TCIM.
8. Select "Options | Refresh" until the TCIM shows status of "Operational".
9. Close the "Unit Configuration" window by selecting "OK"
10. On the "Current Networks" window, select "Networks | All On" to turn the networks back on.

Units
Editing

Unit status and information is maintained and used in AFATDS for mission processing and status monitoring purposes. In addition, unit information is stored for use in creating movement control plans and orders. This section will explain basic editing of Current units. Note that the map symbols do not need to be displayed in order to work with units. Although units may be manipulated (edited, deleted, etc.) using the map, all these things can be done using menus as well.

Planned units are created and edited while in Planning and are very similar to Current units. Planned units do not have class of supply (ammunition, POL, equipment and weapons) and they do not have certain status information (MOPP, RES, weapon status, powder temp, etc.). They are created and edited much like Current units, except they are created and edited within a plan.

In order for a unit to be created in Current or Planning, it must first be in the Master Unit List.

A. Service. All units have one of seven possible “Services”, US Air Force, US Army, US Marine Corps, US Navy, Allied, US Coast Guard, or Neutral. Neutral Units are units that are not part of the friendly force organization and are not identified as enemy. All Neutral units must be in the master unit list before you can create them in a plan or the current situation. Neutral units are displayed in Green on the map.

B. Unit Types.

1. Cannon. Generally, a cannon unit will be the last AFATDS unit in the Cannon command chain. This is not the case, however, when an AFATDS Battery or Battalion is connected to more than one BCS. It is important to enter the status, mission, supported and command HQ, number of weapons, operational weapons, projectiles and fuzes for Cannon units. For Paladin, each gun is established as a separate unit containing one weapon.

2. Rocket. Generally, a rocket unit will be the last AFATDS unit in the Rocket command chain. This is not the case, however, when a Battery or Battalion AFATDS is connected to more than one FDS. It

is important to enter the status, mission, supported and command HQ, number of weapons, operational weapons and uploaded ammo for Rocket units.

IMPORTANT!!

In order for mission processing and unit status updates to work properly, the unit types of units must be absolutely correct. BCSs and FDSs and AFATDS units connected to them have different unit types depending on the configuration. See the section on Tactical Fire Direction (TFD) for configuration of unit using TFD.

When one BCS or FDS is connected directly to an AFATDS workstation, the AFATDS unit will be a Cannon or Rocket unit appropriately and the BCS or FDS unit will be an Other unit. When more than one FDS or BCS is connected to an AFATDS workstation, the AFATDS unit will be an Other unit and the BCS or FDS units will be Cannon or Rocket units appropriately. See figures 28 and 29 below for guidance on establishing unit types for BCSs, FDSs and AFATDS connected to them.

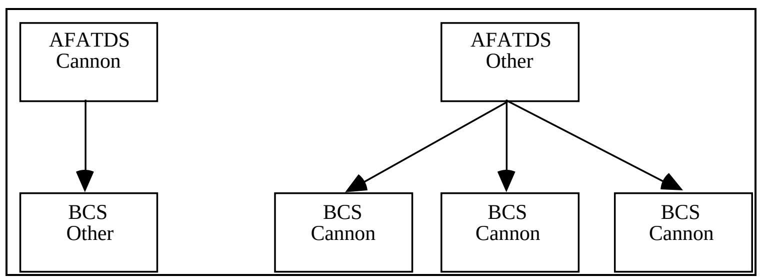


Figure 28. BCS Arrangements and Unit Types.

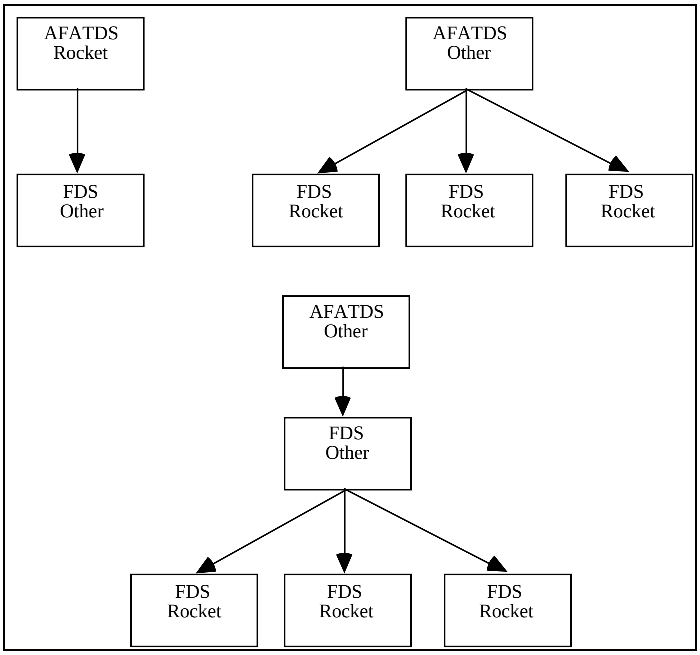


Figure 29. FDS Arrangements and Unit Types.

3. Mortar. A mortar unit is the actual mortar platoon MBC. This unit will not be an AFATDS unit. It is important to enter the status, mission, supported and command HQ, number of weapons, operational weapons and projectiles for Mortar units.

IMPORTANT!!

Editing Weapon Quantities for Cannon, Rocket and Weapon units will not affect the actual entry of weapons (i.e. by bumper number). The same is true for the reverse of this situation. You do not have to enter individual weapon information (Bumper numbers etc.) for AFATDS to work.

4. Air. This unit type is used to designate air attack and non-attack assets. Non-attack assets are lift aircraft required for air drops and medivacs. These units represent all air and aviation units except Army rotary wing aircraft. It is important to enter the response time, available munitions and supported Unit ID for Air units.

5. Aviation. This unit type is used to designate Army rotary wing aircraft as aviation attack assets. It is important to enter the response time, available munitions and supported Unit ID for Aviation units.

6. Naval Ship. This unit type is used for all Naval Ship attack assets. It is important to enter the response time, available munitions and supported Unit ID for Naval Ship units.

7. Observer. This unit type should be used for any observer units which can call in fires to an FSE. These include FISTs, COLTs, Aerial Observers and FOs. These will not be AFATDS units. It is important to enter the supported and command HQ, TLE and ranges for observers.

IMPORTANT!!
A maneuver TF FSE is NOT an Observer unit but is instead an Other unit.

8. Radar. This unit type is for an actual radar unit. The radar battery (TAB) is not an actual radar and should not be a radar unit. It is important to enter the supported and command HQ, TLE and search fence (traverse and ranges) for radars.

9. Other. This category of units generally specifies command posts and FSEs as well as support units, technical fire direction (e.g. BCS, FDS) and any other unit which does not fall into one of the above types. When in doubt, choose this type for a unit. It is important to enter the supported and command HQ for Other type units.

C. Range Fans.

Range fans, for attack units (cannons, mortars, Naval Ship guns, and rockets/missiles), are entered into AFATDS in relative azimuths. In the following example, Figure 30, the first range fan can be thought of as from 5610 mils to 0810 mils with a 0010 mil azimuth of fire -- OR -- as a 0010 mils azimuth of fire with a left traverse limit of 0800 and a right traverse limit of 0800. In AFATDS, the range fan is entered using the second set of numbers, 0800 Left to 0800 Right with a 0010 mil azimuth of fire.

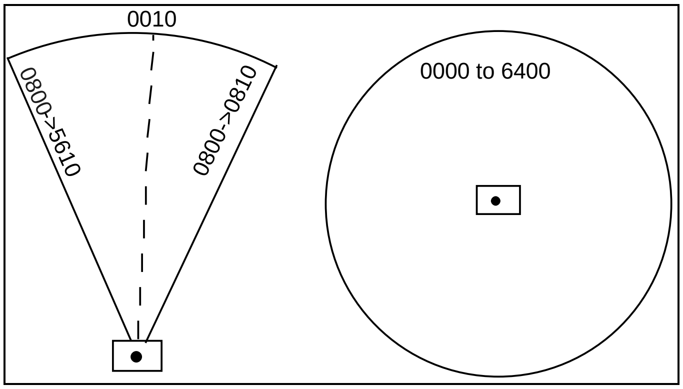


Figure 30. Unit Range Fans

To enter a 6400 mil range fan, as in the second example above, enter 0000 as the LEFT azimuth and 6400 mils as the RIGHT azimuth. This will produce a circular range fan about the unit.

For observer units, enter the range fan by using the actual LEFT and RIGHT limits.

D. <u>To Create a Current Unit.</u>

1. Select “Units | New...” on the Current map -- or on the Select Unit window, select “Options | New...”.
2. The Create New Unit window will open allowing you to select a unit to create. This list is all units in the Master Unit List except all those already in the Current situation.
3. Select a unit to edit and select a unit type for the unit. If in doubt as to the unit type, refer to the listing above.
4. Click OK to continue.
5. The Basic Unit Information window opens. Enter the location and unit symbol information on this window and any other relevant information. Select the General and Detailed selections from the menu tree and enter data for each of these screens.
6. Select "Apply". The menu tree will expand to allow access to other windows and screens. Access these screens and windows to enter appropriate data.
7. Once back to the Basic Unit Information window, either click OK to save the unit information.

IMPORTANT!!

When creating a unit to represent a BN FDC or a BTRY FDC that controls subordinate fire units, DO NOT select the FDC unit symbol for these units. AFATDS bases certain processing on the unit symbol type. Select the FA CP unit symbol for these units. FDC's that directly control weapon systems (Battery and platoon FDC's) may be entered using the FDC symbol type.

IMPORTANT!!

A unit type and its weapon model (if applicable) must not be different for that unit in another Plan or Current. For example, 1/A 1-40 cannot be a cannon unit in Plan Red and a rocket unit in Current.

NOTE!

The role, echelon and function that is established when the unit symbol is created is used by AFATDS to determine valid message interfaces between that unit and other units. The symbol for an AFATDS OPFAC or a non-AFATDS unit that is operating as an FSE, FA CP or Fire Unit should be created with compatible roles, echelons and functions. (i.e.; An FSE or FA CP should not have a role or function of unit).

NOTE!

Operator's should not use an "artillery" type unit received from JMCIS to create a new "artillery" unit in AFATDS. AFATDS will create all new units created in this manner as cannon units.

E. To Copy a Current Unit.

1. Open the Current Map.
2. Select "Units | Edit...".
3. The Select Unit window will open to allow selection of the unit to copy. Select the unit and select "Options | Copy...".
4. The Select Unit To Copy To window will open. Select the Unit ID you wish to create and click OK.
5. The Copy Unit Information window will now open allowing you to choose which information to copy over to create the new unit. Select (depress) the buttons associated with the information you wish to copy over. Note that the unit ID shown in this window is the unit ID of the unit you are copying FROM. Click OK.
6. The unit will now be created and placed in the Select Unit window for editing. To edit it, follow the directions below.

F. To Edit a Current Unit.

1. Open the Current Map.
2. Select "Units | Edit...".
3. The Select Unit window will open to allow selection of the unit to edit. Select the unit and select "Options | Edit".
4. The Basic Unit Information window will open showing the Basic Info for the unit.
5. Use options under the Options menu to edit more detailed information about the unit.

G. To Delete a Current Unit.

1. Open the Current Map.
2. Select "Units | Edit...".
3. The Select Unit window will open to allow selection of the unit to delete. Select the unit and select "Options | Delete...".
4. Delete Unit Information window will appear giving the operator the option of selectively deleting specific information or of deleting all information.
5. A confirmation will appear asking if you really want to delete the unit or selected items. Answer "Delete" to the presented confirmation.

-- OR --

1. Select the unit on the map with Button 1.
2. Hold down on Button 3 and select Delete under the popup menu.
3. A confirmation will appear asking if you really want to delete the unit. Answer "Delete" to the presented confirmation.

NOTE!

If you delete a unit in order to change its unit type (for example, Other to Cannon) you must also delete it from all plans.

H. <u>To Print a Report about a Current Unit</u>.

1. Open the Current Map.
2. Select “Units | Edit...”.
3. The Select Unit window will open to allow selection of the unit to print information for. Select the unit and select “Options | Print...”.
4. The Print Unit Information window will appear. Choose those categories of information you would like printed. Click OK.

-- OR --

1. Open the Current Map.
2. Select "Units | Edit...".
3. The Select Unit window will allow you to highlight unit. Click OK.
4. At Basic Unit Info window, select "Status | Print".
5. Print Unit Information window will appear. Choose those categories of information you would like printed. Click OK.

I. <u>To Print the Master Unit List.</u>

The Master Unit List (MUL) can be printed to include all units in the MUL or only the entries selected by the operator. The operator can use the “filter” function of the Master Unit List window to select the units / types that will be output to the listing. For all of the information to appear in the listing the operator must select **17 characters per inch (CPI)** for his output when the print job is sent to the printer. The following is a list of the information fields that will be provided in the output:

1. Unit Number
2. Unit ID
3. VMF Unit ID / Ref Number
4. TACFIRE / ACCS Alias
5. Device

J. <u>Making a Target from an Enemy Unit</u>. You may have AFATDS automatically create a target on an enemy unit. The target data will be based on the enemy unit's location and unit type. To do this follow the steps below.

1. Make sure you have a Target Number block set up.
2. Select the enemy unit on the map (one at a time) and use the RIGHT trackball button to display the pop-up menu for the symbol.
3. Select "Add to Target List" from the pop-up.

--OR--

1. Open the Enemy Unit List for the Plan or Current situation.
2. Select the Enemy Unit in the list.
3. Select the "Add to Target List" option.

The new target will appear on the Master Target List (in Planning) or the On-Call List (in Current).

Units
Mission Processing

In order to correctly process fire missions, AFATDS relies heavily on unit information. If the correct unit data is not present, units may show up as not capable or not even considered for missions. The following outlines special entries for units which are critical for mission processing. Use this as a checklist when you have mission processing problems.

Unit Type. The unit type (as outlined in B in Units: Editing) is important as it tells AFATDS which units are FSEs and FA CPs as opposed to attack assets capable of actually shooting missions. AFATDS only considers FA Cannon, Rocket, Mortar, Naval Ship, Aviation, and Air as actual attack assets. All technical fire direction units co-located with AFATDS OPFACs such as BCSs and FDSs should be entered as Other type units while the actual AFATDS should be entered as a Cannon or Rocket appropriately. FIST's and COLT's should be entered as Observers.

Unit Location. For surface to surface attack assets (Cannons, Rockets, Naval Ship, and Mortars), the unit location is important as it will determine whether the unit is capable of ranging the target.

NOTE!

When entering the location of a Naval Ship unit on the Basic unit data window, you may enter in the coordinates (as normal) or you may select a Position area (from the "Position area" menu item on the form). When you select a position area, the unit's location will be updated as the center of the position area you selected (note that the selected position area must be a circular or rectangular geometry in order for this to work). It is recommended that, if you want to establish a "Fire Support Area" geometry for an Naval Ship unit, you use the "Position area" geometry type when you create the geometry. Then name the geometry something like "FSA 12", "FSA A5" etc.

Left and Right Azimuths. The left and right azimuths (in mils) will determine the unit's range fan. If a target does not fall within this range fan, the unit will be considered incapable to perform the fire mission due to range limitations. See item (C) in the previous section for more on left and right azimuths.

Min. and Max. Ranges. The min. and max. ranges (in meters) will determine the unit's range fan. If a target does not fall within this range fan, the unit will be considered incapable to perform the fire mission due to range limitations.

Status. The Status (e.g. Ready, Moving, Out of Action, etc.) is important. A unit will ONLY be considered capable to shoot a mission if the status is READY or AVAILABLE. If it is MOVING, it will be considered but will be shown as incapable with a status of Moving. OUT OF ACTION units will not be considered for fire missions.

Ammunition. In order for an attack asset to be munitions capable for fire missions, appropriate and matching projectiles and fuzes must be entered for the unit. Propellants are not used by AFATDS to determine range capability or munition capability. Range to target is compared against the max. munition range to determine if the unit is range capable. To reflect a reduced range capability due to propellant availability (For example 1/A 1-40 only has Green Bag propellant), simply enter a maximum range that would reflect the unit's range capability based on that propellant. You may want to consult a Tabular Firing Table (TFT) to determine a good range.

Available Munitions (Aviation, and Air). In order for Aviation, and Air to be capable to perform fire missions, the available munitions needs to be specified so AFATDS can determine an attack solution. If no munitions are specified, the unit will be considered incapable due to lack of munitions.

Weapons (Qty). The number of weapons On Hand (entered on the Detailed Information window) must be at least one (1) in order for an attack asset to be considered capable to perform a fire mission.

Command HQ. The command HQ of a unit is important as it will specify the command structure used for determining what attack assets belong to which FSEs and FA CPs. See the next section for more information.

Supported HQ. The supported HQ of a unit is important as it will specify the mission support structure used for determining which attack assets are controlled by which FSEs and FA CPs as well as to whom missions should be sent for additional processing. See the next section for more information.

Unit Roll-up Data. FA CP units have a roll-up of their subordinates range fans and ammunition data. The FA CP must send its detailed unit data, ammunition, and weapons summary to any OPFAC that is going to perform Unit Attack Analysis using that FA CP.

Units
Command and Support HQs

The Current Command HQ and Current Supported HQ entries for each unit play an important part of how AFATDS performs missions, distributes information and controls supply information. Without the proper command and support information entered into your system, AFATDS will not operate properly.

This chart shows the typical ways Current and Supported HQ are used. It also provides some examples of Command and Supported HQ units.

	Command HQ	**Supported HQ**
How to Determine	• The unit who commands another unit • The unit another unit is attached to.	• The unit to whom another unit is DS, R, GSR or GS. • The unit to whom another AFATDS unit would send unsupportable missions and MFRs.
FO	FIST Company	FIST Company
FIST	Task Force FSE	Task Force FSE
Task Force FSE	Brigade FSE	Brigade FSE
Brigade FSE	DS Battalion CP	Division FSE
DS Battalion CP	Divarty	Brigade FSE
R Battalion CP (Divisional)	Divarty	DS Battalion CP
GS Battalion CP (Non-Divisional)	FA BDE CP	FA BDE CP (If you want missions for the non-divisional CP to flow thru its FA BDE.)

	Command HQ	**Supported HQ**
How to Determine	• The unit who commands another unit • The unit another unit is attached to.	• The unit to whom another unit is DS, R, GSR or GS. • The unit to whom another AFATDS unit would send unsupportable missions and MFRs.
FA Bde attached to Divarty and GSR to DS Bn CP	Divarty	DS Battalion CP

This chart shows the various ways in which the Command and Supported HQ entries are used within AFATDS.

(1) <u>Attack Analysis</u>. When processing a mission, to determine the available attack assets, both the Command and Supported HQ are used as well as units specific in these four places,

(a) Observer/Operator Specified,

(b) Mission Routing (for Immediate Suppression/Smoke missions),

(c) FA Unit Preference Table or FS Attack Parameters/System Task List and

(d) This OPFAC.

Any directly supporting Naval Ship, Aviation, Air, and Mortar assets are used as is any FA units in the Command chain or the Supporting chain. (The chain is found by looking at all subordinates and all supporting units for the units listed above. The search will continue with those units, through the subordinate unit chains, until any Cannon, Mortar or Rocket units are found. All other units are not considered.)

(2) Data Distribution. Several data distribution lists are automatically created for you based on Command HQ and Supported HQ information in the database. These lists cannot be edited, but they are automatically modified when you change your or your subordinates Command HQ or Supported HQ information. (a) Higher - This OPFAC's Command HQ (b) Subordinate - All units with this OPFAC as their Command HQ (c) Supported - This OPFAC's Supported HQ (d) Supporting - All units with this OPFAC as their Supported HQ
(3) Schedule of Fires. When initially developing a Schedule of Fires, the attack assets presented are found by looking for all attack assets in your Command or Supported chain (see 1). When disseminating a Schedule of Fires to an FA CP, only the schedules for those units which are in his Command or Supported chain are sent.
(4) Supply Summary. When viewing a unit's Summary Supply Information (POL, Equipment, Weapons or Ammo), that unit and all units showing him as their Command HQ are displayed. That unit shows his total supply as well as the total supply of each of his commanded units.
(5) Unsupportable Targets. Any unsupportable targets will be sent to your OPFAC's Supported HQ if you select the "Unsupportable" button on the Intervention window.
(6) Coordination of ZORs. Coordination of ZORs is based on the Support HQ relationships. A mission will require coordination with a ZOR if the observer, his Supported HQ, or the originator of the mission is not the same as the responsible unit for the lowest echelon ZORs that enclose the target area of ZORs is based on the Support HQ relationships. A mission will require coordination with a ZOR if the observer, his Supported HQ, or the originator of the mission is not the same as the responsible unit for the lowest echelon ZOR
(7) Priority of Fires (in Mission Prioritization). A mission will receive the Priority of Fires ranking if one of the following is the Priority of Fires entry: a) Observer b) Observer's Supported HQ c) Originator of the mission (i.e. The OPFAC that sent you the mission)

Units
Unit Status Monitoring

In AFATDS, several different categories of supply are maintained: POL, Equipment (including weapons) and Ammunition. The Description, Summary Info and Detailed Info windows allow quick access to the status of a unit's supplies. The Description shows a rough summary of the status of each of the classes of supply and also the status and location of the unit. The Summary and Detailed Information shows actual supply counts and status for models of ammo, equipment, weapons and POL. The Summary and Detailed windows show this status for both the selected unit as well as all of its subordinates.

IMPORTANT!!

Information shown on the Summary and Detailed windows is based on numbers taken from subordinate units. This is only available through Data Distribution. No status will be shown for a unit if there is no data distribution or updating of that unit's data.

A. <u>To View Overall Status of a Unit</u>

1. Select the Unit on the map with Button 1.
2. Click and hold Button 3 to get a popup.
3. Select "Description" under the popup.
4. The Description window will open. It will display the Unit's status for POL, Equipment (except Weapons), Weapons, and Ammo. It will show it as Green (Go), Amber (Degraded), Red (Critical) or Black (No Go). White indicates the category does not apply to the unit (for example, observers do not have weapons), or you have insufficient data to display a status on that unit.

-- OR --

1. On the Current map, select "Units | Description...".
2. The Select Unit window will open. Select the Unit to obtain a Description on and click OK.
3. The Description window will open. It will display the Unit's status for POL, Equipment (except Weapons), Weapons, and Ammo. It

will show it as Green (Go), Amber (Degraded), Red (Critical), Black (No Go) or White (Insufficient Data).

B. To View Summary Status for a Category of Supply

1. Open the Description window for a unit (see above).
2. Select the button on the appropriate category of supply.
3. The Summary Information window will open. For different categories of supply, this window will show the status of the unit and all of its subordinates.

NOTE!

When you view information on a unit (through the "pie chart" on the unit description window), AFATDS will display the associated unit on the top of the form and show that unit's subordinates on the bottom. Each subordinate unit will be displayed with summary information (e.g., number of fuzes on hand). The unit on the top of the form may also have data displayed. This data will come from one of the following:
a. If the unit you are viewing information on is yourself or a unit that you backup (CONOPS), then the data will be calculated from the subordinate totals on the bottom of the window.
b. If the unit you are viewing information on is not yourself or a unit that you backup, the data displayed on the top of the form reflects the latest summary information that you have received on that unit at your OPFAC. If that unit has not sent his summary status to you, the totals on the top of the form will be blank (with no color codes either).

C. To View Detailed Ammo Status

1. Open the Summary Information window for Ammo for a unit (see above).
2. Select "Options | Detailed" on this window.
3. The Detailed Information window will open for Ammo. For different categories of supply, this window will show the status of the unit and all of its subordinates.

Units
Ammunition Data

A. AFATDS is designed to maintain complete data for artillery ammunition. AFATDS requires the operator to specify ammunition category, model lot code, lot number, and quantity for cannon ammunition. See example below.

Category	**Model**	**Lot Code**	**Lot Number**	**Quantity**
HE	M107DC	A	ABC95D123-456	200
PD	M557	A	ADE96F234-567	230
White Bag	M4A2	W	WHI85J987-654	150

B. BCS, IFSAS and other TACFIRE type legacy devices that handle ammunition data do not store a complete lot number. To maintain accurate data between these systems, the one character lot code is used. When AFATDS receives ammo data for a particular unit, it goes to the data currently on file for that unit and looks for the corresponding category, model, and lot code. If it does not find matching data, it treats the received information as new data, and assumes that a new lot has been added. If data is exchanged between systems without regard for matching lot codes, ammunition is likely to be counted multiple times.

C. Ammo data messages from TACFIRE type devices may be interpreted in one of three ways, depending on the 'action code' associated with the message:

1. AMOH or 'Ammo On Hand'. This is most commonly used. AFATDS interprets this as the amount of ammunition currently on hand at the unit for the specified ammo models and lots. AFATDS replaces existing data for the matching lot codes with data received in this message.

2. AMOE or ‘Ammo Expended’. AFATDS subtracts the quantities in this message from existing data for the corresponding lot code.

3. AMOR or ‘Ammo Received’. AFATDS adds the quantities in this message to existing data for the corresponding lot code.

D. Ammo Storage Sites. For rocket units, AFATDS maintains data on ammo stored away from the fire unit location in an ammo holding area (AHA). Quantities of ammunition can be associated with an AHA. A location can also be assigned to the AHA. To enter an AHA data, do the following:

1. Go to Basic Unit Data window for selected unit. Select Stored Rockets from menu tree.
2. Select ‘new’ (or highlight existing site and select ‘edit’)
3. Select a two character designation for Storage Site (like "A1", "C2", etc.); enter location of Storage Site.
4. Select OK
5. Select a Storage Site.
6. Enter Authorized Quantity for munition Category.
7. Select Edit.
8. Enter quantities for munition.
9. Select OK.
10. Okay unit window. Updated data is now entered.

IMPORTANT!!

All Ammo holding areas should have a corresponding location. If no location is specified for a unit’s AHAs, then ammunition data for rocket units cannot be sent to external systems. AFATDS will generate a ‘translation failure’ alert message, because the system lacks required data for building the message. Also, the holding area name should be a letter (A, B, C, etc.). Followed by a number between 1 and 9. This is so the holding area information can be sent to non-AFATDS devices (like an FDS).

E. Mortar and Naval Gun Ammunition. Lot codes and inventories are not required (and should not be entered) for mortar and Naval Gun munitions. This is because these systems do not track their data in the same way that FA cannon units do.

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Units

Guidance
Entry and Use

Guidance in AFATDS is divided into six major categories:

1. Target
2. FS Attack
3. Unit and Sensor
4. FA Attack
5. C3
6. Miscellaneous

Some guidances are merely record keeping tools, others allow the information to be placed into a written plan (e.g., an OPORD or FS Annex) and others are used when processing fire missions to determine HOW and WHEN to attack targets. The next section provides a list of the guidances which are used in mission processing; guidances not used in mission processing are not discussed. More information can be found in section on mission processing.

A. <u>Target Categories and Types</u>

In AFATDS, there are Target Categories. Within each target category there are Target Types. Many systems, such as IFSAS, call these the Target Type and Subtype instead. Many of the guidances in AFATDS will allow you to specify guidance for each individual target type. When a call for fire is received at AFATDS for processing, the target type of the mission is used to find what specific guidance has been given for that target type. (See Appendix E for a list of Target Categories and Target Types in AFATDS.)

B. <u>Kinds of Guidances</u>

Of those guidances used in processing fire missions, some are called FILTERS. These filter guidances determine if the target should be shot or not. For example, if the target is a duplicate of another target, we need to eliminate the second call for fire; the Target Duplication guidance will filter these types of targets out.

Some guidances are used to determine HOW or WHEN to shoot the target. They allow targets to be prioritized relative to one another as well as provide information on what kinds and volume of munitions or what effects to use on the target.

Other guidances are considered PREFERENCES. For these, the entry you make will not necessarily be the solution provided for a fire mission as other information may be taken into account as well. For instance, when shooting a certain target type, your preference may be to shoot it with DPICM, TIME, 2 PLT volleys. But if no units have DPICM, other shell/fuze combinations will be chosen. If available, alternatives will be given, but your preference may be ranked higher than other alternatives and may in fact be the suggested option. Preference guidances allow blank entries to be made; for these guidances, blank entries just mean NO PREFERENCE.

C. OPFAC Role and Mission Types

Not all guidances are checked at every OPFAC. Whether a guidance is used or not depends on the role you've set in the Unit Configuration window as well as the type of fire mission being processed. There are three (3) roles an OPFAC can be set to in order to process fire missions. Note that OPFACs set to an IUC or to a Training Role cannot process fire missions. An IUC can, however, initiate a fire mission and send it to an OPFAC for processing.

The three (3) fire mission processing roles are:

1. FSE - Fire Support Element - includes Marine FSCCs.
2. FA CP - Field Artillery Command Post - includes Marine FDCs.
3. FU - Fire Unit - sometimes called FDC.

In addition there are several types of fire missions which can be processed at those OPFACs:

1. CFF - Call For Fire - Fire mission received directly from an observer unit, initiated at the keyboard at that OPFAC or an ATI received directly and converted to a CFF.
2. FSE FR - Fire Request - Fire mission at an FSE received from another AFATDS unit.
3. OTF - Order to Fire - Sent from an FSE -- or sent by or received at an FA CP.
4. FO - Fire Order - Sent from an FA CP -- or sent to or received at a FU.

Processing Unit's Role	FSE	FA CP		Fire Unit	
Message	FR	FR	OTF/FO	FR	OTF/FO
Guidance					
ATI Checking	X	X		X	

Processing Unit's Role	FSE	FA CP		Fire Unit	
Message	FR	FR	OTF/FO	FR	OTF/FO
TSS	X*	X*		X*	
Duplication	X	X	X	X	X
Exclusion	X	X		X	
Target Buildup	X	X		X	
IEW Routing	X	X		X	
Immediate Routing	X				
Mission Value Calculation	X	X	X	X	X
Mission Cutoff Check	X	X	X	X	X
FSCM's	X	X	X	X	X
FS Tasks	X	X	X	X	X
FS Attack ** Parameters	X				
FA Preference Table		X	X		
Special Tgt Allocation	X	X	X		
FSCM's	X	X	X	X	X

* TSS is only used on a CFF if the option of "Check TSS Against Calls for Fire" is chosen.

** The data in this guidance is used when running system Attack Analysis. If Unit or Detailed Attack Analysis is being performed and your OPFAC is an FSE, the Unit ID entered for a given FS system (e.g. "FA Cannon" - "3 Bde FSE") will be the destination unit for missions assigned to that system. Fire units and/or FA CPs that work for that unit will be considered in attack analysis.

Guidance
Use in Mission Processing

A. Target Selection Standards (TSS). This is the first filter guidance considered when an ATI or CFF is processed by AFATDS. ATIs are always checked against TSS. If the ATI fails the TSS guidance it will be considered a “Suspect” target and be sent to the target generation function for further processing. CFFs may be checked against TSS if the operator elects to do so (simply by selecting the “Check CFFs against TSS” option on the TSS guidance window). CFFs failing TSS will likewise be sent to target generation as a suspect target. If the “Check CFFs against TSS” option is not selected, ALL CFFs WILL PASS TSS. TSS consists of three primary checks:

- ACCURACY. Is the TLE of the target less than or equal to the “Max TLE” in the TSS guidance.

- REPORT AGE. Is the time difference from the “DTG Acquired” of the target to the current time less than or equal to the “Max Report Age” in the TSS guidance?

- RELIABILITY. Is the Observer reliable in reporting this type of target? (if not - the target will fail TSS)

When checking TSS, AFATDS gets the “TLE” and “time Acquired/sensed” for the target. The observer’s unit data is also checked to see if the observer is “reliable” for the target type in the ATI or CFF. AFATDS determines these three critical elements of the target as follows:

IMPORTANT!!

The observer’s Reliability used during the TSS check is based on:

1. **The reliability indicator (Reliable vs. Non Reliable) in the observer’s unit data.**
2. **If the reporting sensor is not an observer or radar unit type, it is assumed to be reliable and will pass the "Observer Reliability" aspect of TSS.**

IMPORTANT!!

The TLE used on the mission will be based on:

1. **The TLE submitted with the target data.**
2. **A calculation considering the sensor's range to target (for targets sent by Q36 or Q37 Radars only).**
3. **The TLE value for the observer in the AFATDS database (when an ATI is received directly from the observer).**
4. **A default value considering the unit type that sent the ATI to you (e.g. when IFSAS sends an ATI report to AFATDS, the TLE would be between 400-500 meters). (See the table in the target generation section of this notebook for more information.)**

IMPORTANT!!

The "DTG Acquired" used on the mission will be based on:

1. **The "Time Acquired" or "Time Sensed" submitted with the target data.**
2. **If a time is not provided, AFATDS will use the time the target was received at the 1st AFATDS box as the "DTG Acquired".**

B. High Value Target (HVT) List. For each target category, specifies when to attack the target (Planned, As Acquired, Immediate or Excluded), the effects on the target (Suppress, Neutralize, Destroy or allows an operator entered effects percentage) and also allows a weighting of each category relative to each other (each category can be given a value between 0 and 100).

This guidance is used in two ways: (1) as a starting point for creating the TMM and (2) to provide priorities for target categories.

C. Target Management Matrix (TMM). For each target type, this guidance allows the target type to be placed in a High Payoff Target (HPT) List, an Excluded Target list or a non-HPT List. For HPTs and non-HPTs, it allows entry of when to attack the target and the effects on the target. For HPTs it allows a weighting to be set to rank HPTs relative to each other.

- For non-HPT target types, the HVT List weighting for the target type's target category is the weighting of the target type.
- For HPTs, it allows entry of an ADDITIONAL weighting of a target type above and beyond the BIGGEST weighting in the HVT List. The new weighting is the BIGGEST HVT List weighting PLUS the assigned weighting for the HPT. For example, if the biggest weighting of all categories set in the HVT List is 95 and the HPT is given a weighting of 20, the real weighting of the target type is 115.
- For all target types, specifies whether to route the target to IEW (Intel/Electronic Warfare) for coordination and/or perform TDA on the target.
- When the TMM is cleared and the window is closed without re-assigning any or all of the target types, all remaining unassigned target types will be assigned to the non-HPT or excluded list. If the target type's category is set to excluded in the HVT List, the target type will be put into the excluded list, otherwise it will be put into the non-HPT list. The "When" values (e.g., As Acquired, Immediate) and the effects values (e.g., Suppress, Neutralize) will be taken from the HVT List for the target type's category as well.

D. Mission Prioritization. This guidance determines the ranking of priority fire units and TAIs and whether On Call targets have higher priority than non On Call targets. It also allows the weighting of the four basic components that determine a mission's value: Target Type weighting (from TMM), TAI ranking, Priority of Fires ranking and On Call Targets. Finally, this window allows entry of Fire Mission Cutoff Values which a mission must meet or exceed in order to be considered by a given system.

- This guidance is the central guidance for determining a mission's total value. Mission value is covered in the next section.
- On this window, Priority of Fire can be entered so that originators of call for fires and their supported HQs can be prioritized. Units can be added or removed from the Priority of Fire list.
- The TAIs shown are all TAIs in the situation. You cannot add or remove TAIs from this list.
- The "On Call Targets Have Higher Priority" check box is an on/off switch (on when it is depressed or grayed). This allows On Call targets to get "bumped up" a notch compared to other missions.
- The Mission Cutoff Value is a "filter" guidance which determines which systems (FA, Mortar, NSFS or Air) are allowed to shoot the mission. The mission's total value is compared with this and if the value is not GREATER than that of a certain system then the mission will not be shot by that system. For example, if the mission's value is 34 and FA is set to 30, FA will be considered if any FA assets are capable. If is set to 50, NSFS will not be recommended to shoot it.

E. Mission Routing. Specifies preferred unit IDs for routing of Immediate Suppression and Immediate Smoke missions. This guidance allows more expedient processing of urgent targets since the mission will be sent directly to the specified attack unit if capable of attacking the target. This guidance is checked only at FSEs.

- This guidance can be left blank and AFATDS will suggest a unit.

F. Special Targeting Allocation. This guidance provides allocations for Special missions. A text view of this guidance can be pasted into text portions of the written FS or FA Support Plan.

- Selected maneuver units can be added or removed from the MVR Unit List.
- For each of the fire mission types (FASCM, Priority Target, Priority Copperhead, Planned Copperhead, and FPF) a Fire Unit can be assigned, along with the allocated number of missions.
- Only the FPF and Priority Copperhead fields in this guidance are used in mission processing. When either of these "assign" mission types are received, AFATDS will determine the unit to receive the mission based on the guidance and route the mission to the unit specified in the FU ID field (if it is capable).

G. System Task List Guidance. This guidance consists of operator settable “Rules” (up to 200) that are used when missions are processed. A rule can be permissive such as “Tank Heavy, in TAI 23 with a strength greater than 10- attack with MLRS DPICM”, or restrictive such as ADA Targets - do not engage with Aviation”. This is a very powerful tool which allows the operator to tailor the attack of targets. The parameters are:

1. Target Parameters.
   - Target Category
   - Target Type (selectable only after a category is selected. If a type is not selected all other parameters apply to all targets in the category.)
   - Geometry Area (Target would have to fall within the area for the rule to apply).
   - Minimum Target strength. (target must meet or be greater than the specified value to be selected).
   - Maximum Target Strength (provides the upper boundary for strength)
   - Minimum Radius (defines the minimum target size for the rule to apply).
   - Maximum Target size (defines the maximum size for the rule to apply).

2. Action Parameters:
   - Do Not Engage (specifies that the conditions defined are do not engage criteria)
   - FS System (identifies the system that correspond to the rules)
   - Unit (when the system is selected the operator can further refine guidance to a particular unit which has that system. Will include CP selections)
   - Munition (prefers a specific munition or restricts the use of the munition when the specified target or other action parameters are met.)

Rules are automatically ranked when they are entered based on the number of specified parameters. The more parameters specified, the higher rank the rule. They are also ranked based on the sequence of input. For example, when two rules that have equal parameters the rule input first will take precedence. The operator has the option of specifying a ranking for a rule. When this is done the rule will also retain that rank until deleted. The operator specifying the rank overrides the parameter input. For example, if operational personnel decide that they want to attack all Tank Heavy with "Rocket/Missile". They enter the rule and give it a high ranking. Even though there may be other rules that apply to this target with a larger number of parameters, the higher ranked rule will be used. The same applies when restricting attack with the do not engage button. If the operator does not want a particular category or target type engaged he would specify that criteria and rank specify the rules ranking. What he would not want to do is specify "Do Not Engage" for each FS system (reason will be explained latter).

When the rules are used that apply to attack analysis, only the top five permissive and the top five restrictive rules are considered. This is where the ranking options play an important role in achieving the desired results. If a Restrictive rule and permissive rule are in conflict the restrictive rule will apply. As you can see, with the choice of 6 FS systems, the correct way to assure that a target is not attacked is to Select the Target Type, specify "Do Not Engage" (without selecting any FS system), and operator rank this rule higher than others. If you individually restrict each of the six FS system types the last rule entered would not be used by AFATDS.

In the FS system task the “Do Not Engage” selection is the criteria for selection of “Restrictive Parameters”. All other choices are considered as permissive. The selection is not only applicable to the selection of a unit or FS system, but is used based on the selected parameters; Do Not Engage Tank Heavy strength less than 10. The list is traversed from the top to the bottom until five restrictive and five permissive rules that meet the target parameters are identified (or the list is exhausted). There are some important items to consider:

- A selection of Category and not target types will result in selection of the rule based on its rank for all Targets in that Category.
- When geometry is specified, the rule will be selected only if the received target falls in the area described by the geometry.
- Rectangular targets will be converted to a circle (of equivalent area) for the radius checks.
- The selection of a munition category and not a specific unit or FS system will apply the rule against that category for all FS systems that have that category of munitions.

As you can see this is a powerful tool that, when applied with a little common sense, provides automatic tailoring of the attack of targets far beyond the capability of just specifying a volume of fire. A myriad of possibilities and combinations exist only limited by the imagination of the operational personnel. This tool allows specific commanders guidance to be input to AFATDS and executed in an automated mode.

Other capabilities are the display of all rules in the system, the ability to edit rules, the ability to delete rules and the ability to enter multiple rules without returning to the task list window. This is a new feature. Since most of the time the operational personnel will have multiple rules to enter, a "Apply" button was added. When the operator selects apply, a fresh window is displayed allowing for another rule to be entered. This eliminates the need to re-enter the required window and should prove to be a helpful convenience for the operator.

H. <u>System Attack Parameters Guidance</u>. This guidance is designed to support fire support system attack analysis. FS system attack analysis allows operators at an FSE/FSCC to perform attack analysis without having to maintain detailed unit data on available fire units. Instead, the FSE/FSCC maintains basic information on fire support system capabilities, and uses these to determine if a particular fire support system is a suitable choice for engaging a target. This basic information is captured in the Fire Support Attack Parameters Guidance. Fire Support Attack Parameters Guidance consists of four basic elements for each fire support system:

1. <u>Request Routing</u>: This is the ID of the OPFAC that provides the connection between the FSE/FSCC and the specified fire support means. AFATDS will address requests for fire from a particular FS system to the OPFAC specified in request routing. A brigade FSE, for example, would typically enter its supporting DS battalion in this field for fire support system ‘FA Cannon.’ It might enter the Division TAC FSE’s ID for fire support system ‘Air.’ (This assumes that the

TAC is in charge of processing requests for immediate air support from the brigade FSEs.)

NOTE!

If you are running Detailed or Unit Attack Analysis, the unit specified in the "Route To" field is used by AFATDS to derive fire units (for detailed attack analysis) or FA CPs (for Unit Attack Analysis). The "Unit Prefs" used in A96 and A97 is replaced by this guidance.

NOTE!

Do not use a FDS platoon as a Rocket Missile routing address in the System Attack Parameters window. During System Level analysis, AFATDS only determines a system and munition for a mission. If you do enter a FDS platoon, a solution is identified for a FDS. However, when the operator selects "OK", the mission is not sent and the mission re-appears in the Intervention window with black option gumballs. If you want to send a mission directly to an FDS platoon, the FDS platoon must be subordinate to or supporting your OPFAC.

2. Range Capability: To determine range capability in the absence of fire unit data, AFATDS uses one of two techniques to make a range capability assessment:

   a. Distance (beyond FLOT): The operator selects the word ‘distance’ and enters a distance in meters. This represents the distance beyond the FLOT that the fire support means in question can typically cover, e.g. a typical entry for ‘FA Cannon’ might be 18000 meters. AFATDS would consider ‘FA Cannon’ a range capable option for any target within 18000 meters of the FLOT. In order to use this technique, the FLOT must of course be entered and maintained.

   b. Geometry: The operator may specify an area geometry which represents the range capability of a particular fire support means. Any target lying within the specified geometry is considered range capable for the specified fire support means. This technique might be used to describe the range capability of Naval Ship assets cruising offshore, for example.

3. Response Time: This is the average time in minutes that it takes the fire support system to deliver fires on a target after receiving a request for fire. It is the same as the response time value stored with unit data, but in this case it is applied to an entire system, rather than an individual unit.

4. Saturation Point: This represents the maximum number of missions a given fire support system can handle at one time. When assigning another mission would cause a system to exceed it's saturation point, AFATDS considers the system 'not capable.'

NOTE!

If no specification is made for an element of guidance (e.g. Response time is left blank for FA Cannon) then AFATDS will assume the related system is always capable for that element (in this example, FA Cannon would always be response time capable).

I. Munition Restrictions. Munition restrictions allow the operator to specify detailed guidances on the employment of various munitions. If may be desirable, for example, to restrict the employment of certain munitions in proximity to the FLOT. The commander may wish to restrict the employment of special munitions to targets that meet certain minimum criteria for size, strength, and location accuracy. AFATDS will make these checks automatically when the proper entries are made to the Munition Restrictions Guidance. The operator may specify the following restrictions for munition employment:

1. Restrictions are entered by munition category and FS system.

IMPORTANT!!

Entering a FS System and Munition Category alone DOES NOT constitute a valid restriction. This is merely the 'label' that is used to identify a restriction. AFATDS will accept this entry, but it will not affect mission processing. AFATDS DOES NOT interpret this as a general restriction for the FS system and munition category. You must enter at least one more criterion to create a restriction that will affect mission

processing (e.g. min distance from FLOT, max acceptable TLE, etc.).

If you wish to enter a general restriction for a FS System or Munition Category, use the FS System Tasks Guidance (See paragraph G in this section).

2. For each munition category, the following restrictions may be specified. A restriction applies if any one of the rules are violated:

   a. Minimum Distance from the FLOT: A munition category is ‘not capable’ if this restriction has been entered and the target undergoing analysis lies within the specified distance of the FLOT. For example, a restriction of 3000 M has been entered for munition category Napalm delivered by FS system air. AFATDS will not recommend an air delivered napalm attack option for a target that lies 2850 meters beyond the FLOT. A target that lies 3030 meters beyond the FLOT is a candidate for air delivered napalm.

   b. Minimum Target Strength: This entry represents the minimum acceptable target strength for employing the munition. For example, a minimum strength of 10 has been entered for munition ATACMS-BAT delivered by FS system FA Rocket. AFATDS will not recommend a solution using ATACMS-BAT for a target with a strength of 8, because the minimum strength restriction will apply. A target with a strength of 10 or greater is not restricted.

   c. Maximum Acceptable TLE: This entry represents the largest acceptable target location error for employing the specified munition. For example, a maximum TLE of 200 M FA Cannon/HE. If a target with a radius of 201 meters is processed, FA Cannon/HE will be assessed as ‘not capable’ because the target’s TLE is too great.

   d. Minimum Target Radius: This distance represents the smallest target radius that AFATDS will consider when evaluating a target for engagement by a fire support system with this restriction. For example, a minimum radius of 100 has been entered for FS system ‘air/rockets.’ Circular targets with a radius of less than 100 meters will not be considered for engagement with air/rockets. This restriction applies to circular targets only.

e. Minimum Target Length and Width: Restriction works the same as the minimum target radius restriction, but for rectangular targets.

IMPORTANT!!
The FS munitions restrictions guidance allows the operator to enter a minimum target radius or a minimum length/width, but not both. AFATDS will determine the target area based on what you entered. For example, you enter a minimum radius of 100 m (this equates to an area of 31,400 square meters). AFATDS uses this area as the minimum target size upon which the munition can be used. If, for example, a target with a 200 x 200 meter size (40,000 square meters) is being analyzed it will pass this check.

f. Environment: If any of the environmental conditions included in the restriction are found in the target description, the system/munition will be considered ‘not capable.’

g. Maximum Rounds: This entry represents the maximum number of munitions that can be fired at a single target. A recommended solution employing the restricted munition type will not exceed the quantity entered here. An entry in this field is appropriate for munition types that are normally employed as individual munitions rather than volleys. Examples, include "MLRS-DPICM", "ATACMS-BAT", "SADARM", etc.

h. Max Volleys: This entry represents the maximum number of fire unit volleys that can be fired at a single target. A recommended solution employing the restricted munition type will not exceed the quantity entered in this field. An entry in this field is only appropriate for ‘volleys’ type munitions (e.g. FA Cannon DPICM, FA Cannon HE, Mortar HE, etc.).

i. Effects Cutoff Factor (ECOF): This is the value, between .01 and 10 percent, that represents the minimal additional effects that must be achieved in order to justify firing an additional volley or round. For example, the ECOF is 6 percent and the desired effects is 20 percent, if you fire 1 round you get 14 percent and when you fire 2 rounds you get 17 percent. You would violate the ECOF because you did not achieve at least 6 percent more. When this occurs, AFATDS will provide an option for the lessor volume of fire.

j. Countermeasures: Provides a capability to specify the countermeasures which the operational personnel believe will degrade the performance of the munition to such an extent that it should not be used. If any of the specified countermeasures are listed in the target/mission data for the mission being analyzed, the system/munition will be considered "not capable".

J. Air Attack Methods Table. For each target type, specifies preferred number and type of munition to use when using Air.

- If left blank, AFATDS will consult built-in tables and formulas to determine what air munitions are best to shoot at the target.
- This is not needed if air is not an asset at your unit, and you do not establish an Air Mission Routing Unit.

K. Aviation Attack Methods Table. The aviation attack methods table extends the existing attack methods guidance to the new aviation system type. Its behavior is identical to existing attack methods tables. It allows the operator to specify a preferred munition and volume of fire for the various AFATDS target categories when aviation is the chosen fire support system. The form is based on the existing air attack methods table.

L. Naval Gun Attack Methods Table. For each target type, specifies preferred munition, fuze and quantity to use when using Naval Gun.

- If left blank, AFATDS will consult built-in tables and formulas to determine what to shoot at the target.
- This is not needed if Naval Gun is not an asset at your unit, and you do not enter a " Naval Ship Unit ID" in the Unit Prefs window.

M. Naval Land Attack Missile Attack Methods Table. For each target type, specifies preferred munition, fuze and quantity to use when using Naval Land Attack Missile.

- If left blank, AFATDS will consult built-in tables and formulas to determine what to shoot at the target.
- This is not needed if Naval Land Attack Missile is not an asset at your unit, and you do not enter a " Naval Ship Unit ID" in the Unit Prefs window.

N. Naval Cruise Missile Attack Methods Table. For each target type, specifies preferred munition and number to use when using Naval Cruise Missile.

- If left blank, AFATDS will consult built-in tables and formulas to determine what to shoot at the target.

- This is not needed if Naval Cruise Missile is not an asset at your unit, and you do not enter a " Naval Ship Unit ID" in the Unit Prefs window.

O. Naval Restrictions. For selected Naval Ships, specifies restricted shells, fuzes, and/or missiles.

- To restrict a Naval ship from firing certain shells, fuzes and/or missiles, enter the Naval Ship and specify which munition(s) to restrict.

P. Mortar Attack Methods Table. For each target type, specifies preferred shell, fuze and number of volleys to use when using Mortar.

- If left blank, AFATDS will consult built-in tables and formulas to determine what to shoot at the target.
- This is not needed if mortars are not an asset at your unit.
- If fuze is entered, shell must be entered.
- If number of volleys is entered, shell and fuze must be entered as well.
- If fire unit size is entered, shell, fuze and number of volleys must be entered.

Q. Mortar Restrictions. For selected Mortar units, specifies restricted shells and/or fuzes. Also specifies maximum number of volleys to use on a target and the maximum number of fire units to mass on a target.

- This guidance allows massing to take place. At an FSE, enter your unit (e.g. TF FSE 1-10) and place a value in the max fire units per target. Entering a Max Fire Units of “1” for your OPFAC would prevent massing solutions from being generated. You may enter restrictions for your subordinate and supporting fire units, if desired.
- To restrict a fire unit from firing certain shells and/or fuzes, enter the unit and specify which munition(s) to restrict.

R. Mortar Immediate Attack Methods Table. For immediate suppression and immediate smoke missions, specifies preferred shell, fuze and number of volleys to use when using Mortar.

- If left blank, tables and formulas built-in to the system will be used.
- This guidance is only used by FSEs.

S. FA Preference Table. For each target type, this guidance specifies a preferred ranking of fire units to attack the target. This guidance may be used to cause specific targets to be routed to or attacked by a specific unit. For instance, the Divarty CP may desire to send “counter-fire” targets to the

MLRS unit. To do this, the Divarty CP would place the MLRS unit on the FA Preference Table and rank fire support category targets “1” under the MLRS unit.

- To restrict a unit from shooting certain target types, enter an “R” for that unit.
- To indicate no preference, enter an "N" or leave the field blank for that unit.
- Any units not entered here will considered based on their mission load, capabilities and restrictions.
- FA Preference Table is only used by FA CPs during mission processing.

T. <u>FA Cannon Attack Methods Table</u>. For each target type, specifies preferred shell, fuze and number of volleys to use when using Cannon.

- If left blank, AFATDS will consult built-in tables and formulas to determine what to shoot at the target.
- If fuze is entered, shell must be entered.
- If number of volleys is entered, shell and fuze must be entered as well.
- If fire unit size is entered, shell, fuze and number of volleys must be entered.
- When transmitting the FA Attack Methods to IFSAS (through the FM;ATTACK message), only the “Send Category” button should be used. This will prevent AFATDS from sending 95 or more FM;ATTACK messages (one message for each target type). If you desire to send all target types to IFSAS, wait long enough between sending each target category’s target types so that the message would have been received and processed by IFSAS.
- If you enter a second FFE Shell and Fuze, the system will attack the target with both shell fuze combinations.

U. <u>FA Rocket/Missile Attack Methods Table</u>. For each target typed, specifies preferred munitions and number of rounds to use when using FA rocket units. If left blank, AFATDS will consult built-in tables and formulas to determine what to shoot at the target.

V. <u>FA Restrictions</u>. For selected Cannon units, this guidance specifies restricted shells and/or fuzes. It also specifies the maximum number of volleys to use on a target and the maximum number of fire units to mass on a target.

- This guidance allows massing to take place, however, entering a “1” for the Max Fire Units for your OPFAC will prevent massing. At an FSE or FA CP, select your unit (e.g. 2-37 FA) and place a value in the max fire units per target (e.g., 6). At all OPFACs, enter the max volleys per target for your unit and your supporting and subordinate units (if desired).

- To restrict a unit from firing certain shells and/or fuzes, enter the unit and specify which munitions(s) to restrict.

W. <u>FA Immediate Attack Methods Table</u>. For immediate suppression and immediate smoke missions, specifies preferred shell, fuze and number of volleys to use when using Cannon.

- If left blank, tables and formulas built-in to the system will be used.
- This guidance is only used by FSEs.

X. <u>MET Guidance</u>. This guidance pertains to MET operations for a specific plan. This guidance will specify the frequency of MET flights, the maximum altitude required, the types of MET messages to produce and to whom the results should be provided. This guidance may be adjusted in the planning and current roles at the FA CP that controls the MET assets, and may be distributed in that unit's FA support plan.

Y. <u>Movement Guidance.</u> This guidance contains information on relative priorities that unit classes (sensor, fire, Hq) have when competing for use of the same route segment during movement planning at the FA CP/FDC. When a route segment is needed by more than one unit at the same time, this priority ranking will assist in the route deconfliction process.

Z. <u>Survey Guidance.</u> This guidance contains plan related survey guidance that establishes the survey priorities (by unit ID) within the unit that establishes the guidance. This guidance (when distributed in the FA Support Plan) will provide information to survey elements, fire units, and sensors as the priority order of survey support.

AA. <u>Rocket/Missile Guidance</u>. This guidance addresses ammunition expenditure and launcher dwell time limitations, terminal homing munition data, and other command and control information. Guidance for fire units may be specified from the MLRS Battalion level down to an individual launcher.

BB. <u>MFR Format</u>. The SPLL can be directed to transmit short or long MFR format at the end of a mission. AFATDS requires long MFR format in order to properly update launcher status.

CC. <u>Target Decay Time</u>. For each target type, specifies the dwell time of the target. This guidance is used to establish how long a target can be considered viable after being sensed.

- For example, imagine that the TANK, HEAVY target type has a target decay time of 10 minutes. You receive the FR at 0800 and no "Time Sensed" is provided. AFATDS adds 10 minutes to 0800 (8010) to determine the latest time ("Operational Until") the target can be attacked.

IMPORTANT!!
It is important that other AFATDS OPFACs have their DTG set correctly. If they do not, they will put DTGs on targets and when the target gets transmitted to you for processing, you may fail the target only because your clock is off. To fix this, everyone must set the DTG in the "Clock Synchronization" window.

DD. Target Duplication. This filter guidance specifies the distance any two targets must be apart to be considered duplicate targets as well as the distance that two "similar" targets are apart to be considered duplicate targets. Similar target types are determined inside the software.

- The distance between the two targets is measured from target center to target center.
- The "Any Targets Duplication Distance" is entered to stop a new mission from being fired when it is close to a currently active mission. This is because the new target location may be hit because we are already firing near it's position. The "Similar Target Duplication Distance" is used to account for observer's target location errors. For example, observer 1 calls in a Tank, Heavy target at grid 4000 2000 and AFATDS schedules the mission for attack. Observer 2 calls in a Tank, Medium at grid 4050 2200. In reality they are trying to attack the same target. AFATDS will recognize this based on the "Similar Target Duplication Distance" and identify observer 2's target as a duplicate of observer 1's. In general, the "Any Target Duplication Distance" should be equal to the kill distance of a standard munition (like 100 meters). The "Similar Target Duplication Distance" should be equal to a normal observer TLE (like 200-400 meters).
- Only active targets are compared against this to determine whether they are duplicate targets. If a mission was shot and is now inactive, it will not be compared against new missions.

EE. FS System Buffer Distances. Specifies for each system (i.e. FA Cannon, Rocket/Missile, Mortar, Air, aviation, Naval gun, Naval Land

Attack Missile, and Naval Cruise Missile) the safe buffer distance to be placed around each target when checking FSCMs for coordination.

- In AFATDS, when geometries are checked for violation of restrictive measures or compliance with a permissive measure (e.g. beyond a CFL), a special safety buffer distance is applied to the target. The FS System Buffer Distance indicates the maximum area that an engagement by a given FS System can affect. When a target is checked, the buffer distance is applied to the target for each available FS system and the buffered target is compared against the restrictive fire measures and ZORs to see if engagement by any FS system will violate the FSCM.
- The Buffer Distance is a width, in meters, surrounding the target which will be considered as though it were part of the target area. In the following illustration, Figure 31, each of the target shapes are shown with a Buffer Distance applied.

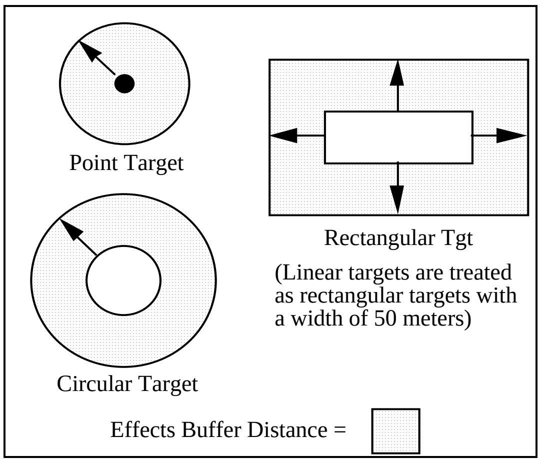


Figure 31. FS System Buffer Distances.

In the example below, Figure 32, while target AA1000 is not in the NFA, the Buffer Distance around the target does cover some part of the NFA. Therefore target AA1000 will require coordination with the establishing unit of the NFA. Note that buffer distances are NOT displayed on the map with the target. If you are getting a lot of coordination requirements, then your buffer distances are probably too large.

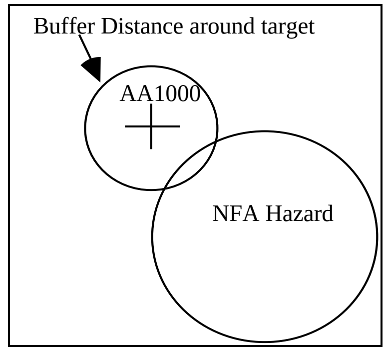


Figure 32. FS System Buffer Example.

FF. CONOPS - Unit Backups. This guidance contains CONOPS OPFAC backup designations for FSE/FSCC, FA CP/FDC, and Fire Unit FDC OPFACs. This guidance may be manipulated by the operator in order to specify backup units (primary and secondary) for specified OPFACs. This guidance serves as a "notebook" for the operator.

GG. CSR Guidance. This guidance establishes the levels for Class V Controlled Supply Rate. The supply rate lists the number of rounds per weapon per day based on the FS system type and munition. The supply rate is further broken down by the day involved "D-Day" indicates the rates for the first day of the planned operations and "S-Day" indicates the supply levels for all subsequent days. The supply levels may vary by plan and may be manipulated in both the planning and current roles. This data may be included in a text format within the FS plan. CSR Guidance is not used in AFATDS processing, but does provide information for the commander.

HH. Reporting Guidance. This guidance establishes the percentage levels (for Class III, Class V, and Class VII supplies) that when attained, result in a "Critical Status" for those supplies. Reporting guidance is expected to be included in the written FS plan (in the service support section) as a guideline to be considered by the FA units that use that plan. The FA planner (operator at the FA OPFAC) can modify critical level attributes in his unit information considering the guidance provided in the FS plan. The percentage levels may vary by plan and may be manipulated on both the planning and current roles. Reporting Guidance is not used in AFATDS processing, but does provide information for the commander.

II. Sending/ Receiving Guidance Data -- Singular Data Transmission.

1. Updates to guidance data may be transmitted between OPFACs. To transmit guidance data, simply open the appropriate guidance

window and select the ‘send’ button. Select the unit(s) to receive the guidance in the ‘send to’ window, and select OK.

2. Received guidance data does not automatically alter current data in AFATDS. Changes to current guidance data must be reviewed and approved by the operator before guidance data at the receiving OPFAC is updated. Operators should do the following when new guidance data is received:

    a. Review and delete received guidance data alert. When guidance data is received, the guidance alert window (“Gu” on the green status bar) will populate for every item received.

    b. Go to the ‘previewer’ (Situation => Received Plans/ Current). The received plans window provides a shorthand description of the data received. If you wish, you can select ‘save’ and the received guidance data will update your current files.

    c. In most cases, it is better to select the ‘preview’ option. This presents you with the received guidance data as it appears on the related guidance window.

    d. If you accept and wish to apply the received guidance, select okay to close the previewer and return to the received plans window. Select ‘save’ on the received plans window. This causes AFATDS to update its guidance database with the received data.

    e. If you do not wish to apply the received guidance, select ‘delete’.

JJ. Sending/ Receiving Guidance Data -- Bulk Data Transmission.

A bulk transfer of current guidance data may be performed by selecting the ‘transfer current’ option under ‘Situations’ on the main menu bar. The procedure is the same as for transferring a plan. See paragraph F, Transmitting/Transferring a Plan in section Fire Support Planning: Transmitting Plans.

Geometries Editing

A. <u>Geometry Types</u>.

Geometries can be created in Current as well as planning. When a geometry is created, it can be specified to be:

1. A point (1 grid coordinate),
2. A line (2-30 grids) or
3. An area which can be a circle (grid and radius), a rectangle (2 points and a width) or an irregular area (3-30 grid points).

IMPORTANT!!

Area geometries should not have the same first and last grid coordinates. The computer will automatically close the geometry by connecting the first to the last point.

IMPORTANT!!

To describe a line or irregular polygon to AFATDS, simply enter the points in 'connect the dots' sequence. When all points are input, AFATDS will draw line segments between the adjacent points (i.e. connect the dots) until it reaches the last point.

If entering an irregularly shaped polygon, AFATDS will join the first and last points to close the polygon. Be sure and order the points in such a way that the line segments between the points do not intersect.

If entering a line, be sure to enter the points from left to right, 'facing the enemy'. This allows AFATDS to determine which is the 'friendly' side and which is the 'enemy' side of a line. This is especially critical in enabling AFATDS to properly check fire support coordinating measure violations.

In AFATDS, lines extend ‘forever’. When determining an object’s relationship to a line (beyond, or short of), AFATDS extrapolates the line as necessary to determine if the object is over or short of the line.

B. Using the Map Mod for Entry of Short Coordinates.

The map mod is a 100 km. x 100 km. area of operations which you expect most everything to happen within. When entering grid coordinates for a geometry, you do not need to enter the entire coordinate when the point lies inside the map mod. The map mod allows the computer to determine the long coordinate when you type in the short coordinate. For example, say the map mod’s lower left coordinate is:

8	00000	048	00000	0	33

If you type in a short coordinate, the computer determines what the rest of the coordinate is based on the fact that it lies inside the 100 km. by 100 km. map mod square. If you type in:

	234		567		

the computer will determine that the coordinate is really:

8	23400	048	56700	0	33

and will store it as such.

Note that the altitude will default to zero (0) meters when not entered. Also, the zeros (0) at the end of the short coordinate do not need to be entered. The zeros (0) to the left of the long Northing do not as well. You can type “48” instead or “048”.

The operator may select display or edit geometry in UTM-Northing Short, GEO-LAT Seconds or MGRS, by using the following commands: <Shift> + <Right trackball button>.

NOTE!

When entering a short coordinate with a grid zone in a coordinate field, you must "Apply" the entry or "OK" the window before "toggling" the location’s coordinate system selection. Failure to do this will result in an incorrect UTM coordinate location.

C. Editing Geometries.

1. Creating a Geometry.

   a. Open the map.
   b. Select "Geometry | New...".
   c. The New Geometry window will open. Input a name for the geometry. If it is an area, select what kind of area (circle, rectangle, irregular). Then select a geometry type and click OK.
   d. The Geometry Information window will open. Select a shape for the geometry (point, line, area). Enter an Effective and Expiration DTG and any other relevant information.

IMPORTANT!!
If the expiration DTG is before the current DTG, when you save the new geometry it will be purged immediately.
New geometries MUST have their expiration DTGs changed before saving.

   e. Click the Coordinates button. This will open the appropriate Edit window.
   f. Input coordinate(s) for the geometry. In a line or irregular area, click "Apply" to get a new location field. The map location coordinate cut and paste feature can be helpful here (see System Initialization: Map Notes).
   g. Select OK on the Edit window. Select OK on the Geometry Info window.

IMPORTANT!!
The Zone of Responsibility (ZOR) geometry should normally be defined as an irregular polygon (i.e. three or more points in "connect the dots" sequence). AFATDS allows ZORs to be defined as rectangles and circles as well. But some external devices (e.g. IFSAS, BCS, FDS) cannot process a circular ZOR. When working with these devices, circular ZORs should be avoided.

2. Editing a Geometry.

   a. Open the Current map.
   b. Select “Geometry | Edit...”.
   c. The Select Geometry window will open. Select a shape for the geometry (point, line, area). Then select the geometry name you wish to edit and click Edit.
   d. The Geometry Info window will open. Edit any necessary information.
   e. Click the Coordinates button. This will open the appropriate Edit window.
   f. Edit coordinate(s) for the geometry if necessary. In a line or irregular area, click “Apply” to get a new location field. The map location coordinate cut and paste feature can be helpful here.
   g. Select OK on the Edit window. Select OK on the Geometry Info window.
   h. You may also edit a geometry by selecting it on the map and using the "Edit" option on the symbol pop-up menu.

D. Effective and Expiration DTG.

The effective and expiration DTG determine when the geometry is active. The DTGs may be specified as actual (e.g. 081200ZJan96) or On Call DTGs. When On Call is specified, enter a relative DTG (e.g. +60) in the fields. If the "Activate" button is selected, the on call values are added to the current DTG to determine the actual effective and expiration DTGs. In planning, an additional capability of H-hour is provided. This allows establishing a DTG relative to the plan-phase's H-Hour (e.g. +30, -20). The plan-phase's H-Hour is set in the Basic Plan Information window and may be changed when you implement the plan.

IMPORTANT!!
On Call geometries are only used by AFATDS systems. External systems do not recognize or use On Call geometries. DO NOT send an On Call geometry to an external system.

E. Dragging Geometries on the Map.

Geometries may be dragged on the map while editing their grid coordinates. This is covered in “System Setup: Map Notes”. The Coordinates window for the geometry must be opened before the geometry can be dragged to a new location. While editing the geometry, just select the geometry with left trackball button and then click on and drag the geometry with the middle trackball button. The grid coordinates in the editing window will update automatically. Make sure you select "OK" to save the new geometry location.

F. Geometry Purging.

When a geometry expires, it is automatically purged from the system. Five (5) minutes prior to expiration, an alert is generated which tells you, the operator, that it will expire. At that time it will become necessary to change the expiration time if you do not want the geometry to be purged.

> **IMPORTANT!!**
>
> **In Current, geometries have an effective and an expiration DTG. When a geometry becomes effective, it can be used as a permissive or restrictive measure for processing fire missions. Five (5) minutes before the expiration DTG of a geometry, the operator with the "Monitor Message" assignment will be alerted that the geometry is about to expire. You will have five (5) minutes to change the expiration DTG or else let it be purged upon expiration. Once the geometry's expiration time is passed, it is no longer used in processing fire missions.**

G. Deleting a Geometry.

You may delete a geometry directly from the Map Symbol menu or from the "Select Geometry" form. In either case when a geometry is deleted, a "Delete" message will be sent to other units based on your data distribution criteria.

> **IMPORTANT!!**
>
> **Some external systems (IFSAS, ATTCS, FED etc...) can only send a date time group that contains day/hour/minute (no month or year). The method that AFATDS uses to convert this DTG is as follows: If the Day is not more than 15 days less than today (System Time) then the month equals the current month, if the Day is more than 15 days less than today (System Time) then the month equals the next month, is not more than 15 days more than today (System Time) then the month equals the current month, is more than 15 days more than today**

(System Time) then the month equals the previous month. Example: If the System Time is 180300zMar98 and a geometry is received with a Start DTG of 10/01/00 and an End DTG of 22/01/00 AFATDS would equate this to mean 100100zMar98 through 220100zMar98. If the System Time is 180300zMar98 and a geometry is received with a Start DTG of 01/01/00 and an End DTG of 22/01/00 AFATDS would equate this to mean 010100zFeb98 through 220100zFeb98. If the duration (Start DTG-End DTG) of a geometry has more days than the month that AFATDS equates a DTG to represent then the message will fail. If this happens, the AFATDS operator must coordinate with the external system to determine the proper duration period and then enter the Geometry in AFATDS manually.

Geometries

Special Geometries/FSCMs

The FSCM check determines if there is a need for coordination of the fire mission. If geometry violations are found and any violations found have not been previously coordinated or overridden then coordination is required. Additional checks which are dependent upon the identification and location of a fire unit -- like fire unit dead space areas -- as well as the location of the target and fire unit -- like crossing a restrictive fire line (RFL), Air Corridor (AC) or Airspace Coordination Area (ACA) -- are accomplished during attack analysis processing.

Before checking a target against FSCMs, AFATDS first applies the FS system effects buffer distance to the target area. The effects buffer distance guidance indicates the maximum area that an engagement by a given FS system can affect. For instance, Mortars might have an effects buffer distance of 100 meters, indicating that engagement of a target with mortars may result in engagement damage up to 100 meters from the target. For a point target, the effects buffer is applied as a radius around the target. For area targets, the effects buffer is added to the target area in all directions. See the Guidance Section of this manual for more information about how the Effect Buffer Distance is applied to the target.

Only FSCMs that are effective (between the effective and expiration DTG) are checked for violations (on-call FSCMs will not cause coordination).

A. <u>ZORs</u>.

Zones Of Responsibility, or ZORs, are areas that represent the sector or zone a Maneuver unit owns. This area is generally an irregular area.

A ZOR requires coordination if the supported unit of the requesting sensor or the mission originator (OPFAC that sent you the mission) is not the same as the unit responsible for the smallest echelon Zone of Responsibility (ZOR) that encompasses the effects area for the target.

ZOR coordination is excused (that is, not required) if:

1. The entire effects area of the target is beyond a Coordinated Fire Line (CFL) and within the same ZOR as the CFL establishing unit (or in a ZOR for a unit commanded by or supporting the unit that established

the CFL). CFLs only excuse coordination for surface to surface fires (i.e. air attack options would still require coordination even if the target is beyond the CFL).

-- OR --

2. The attack option is for Air and the target is beyond a FSCL established by the responsible unit for the ZOR.

--OR--

3. The entire effects area associated with the target is within a Free Fire Area (FFA).

IMPORTANT!!
In order to properly coordinate fires that lie in other Maneuver zones, you must enter a ZOR for each Maneuver sector. The Responsible Unit of the ZOR must be set to the unit that owns the ZOR.

Boundary lines DO NOT cause coordination; only ZORs. In order to properly check unit zones, each appropriate maneuver unit must have a ZOR created in Current. The responsible unit ID for this geometry must be the unit with which coordination must be done, while the establishing unit is the unit which created the ZOR.

B. Close, Deep and Rear Battle Areas.

These three battle area geometries are special in that they determine whether a target is a close target, a deep target or a rear target. Instead of providing distances to the FLOT(s) to determine close, deep and rear, these geometries allow you to tailor the battle area to irregular features. Only one of each of these areas should be entered for a given situation (Current or a given plan-phase). When used as the geometry as an FS tasks rule, the close, deep and rear areas are used to determine Fire Support System preferences for shooting missions. They are also used for determining target allocations to Interdiction and Close Support tasks in the Fire Estimate.

IMPORTANT!!
If a target does not lie within any of these areas, or if none of these areas exist, it will automatically be considered a close target.

C. Air Corridor.

An air corridor is a restrictive fire measure which prohibits fires in or through without coordination with the establishing unit of the Air Corridor. An Air Corridor is similar to a set of ACAs connected end to end, each having a unique width, minimum altitude and maximum altitude. In addition, all of the segments along the air corridor are related by relative DTGs of entry and exit. This allows the air corridor to be given a Critical DTG which determines the actual Effective and Expiration times for each segment.

To Create an Air Corridor.

1. Select "Geometries | New...". The "New Geometry" window will open. Specify a name, force/shape of friendly area (Irregular), and geometry type (Air Corridor), and then select "OK" to continue.
2. The "Air Corridor Information" window is opened. At this point, the only editable fields are the Establishing Unit ID, Critical DTG and the DTG Type radio buttons.
3. Select "Coordinates" to open the "Edit Area" window. On this window, enter each of the grids that make up the path of the air corridor's center line. Do not enter the outline of the boxes that make up the air corridor -- this will be done for you.
4. Click "OK" to close this window and return you to the "Air Corridor Information" window. All segments will be listed in this window.
5. Enter the effective and expiration times as well as the width, minimum altitude and maximum altitude for each segment in the Air Corridor. Note that the effective and expiration times should be entered as relative times to each other (e.g. +0, +30, -20).
6. The No Critical DTG checkbox controls the Critical radio buttons: ONLY if No Critical DTG is unchecked are the Critical radio buttons enabled. Unchecking the No Critical DTG box causes the first segment to be chosen as critical. Set the No Critical DTG checkbox appropriately.
7. Enter the Critical Time. This is the time all effective times and expiration times are based on. Given the type of time chosen (i.e. actual, H-hour or on call), the time will be entered differently (e.g. 080200ZJan96, +40).
8. Enter the establishing unit ID of this geometry.

The effective and expiration times are always relative times, relative to the air corridor itself. Adding the effective and expiration times to the critical time produces the actual time for a segment. Selecting a segment to be critical causes the effective time for that segment to change to zero (0) and all other effective and expiration times to be recalculated to maintain the relative differences between times. (See example below.)

Critical: 090800Z JAN 90   v No Critical DTG

Segment	Critical?	Effective	Expiration
1		+05	+15
2		+10	+30
3		+30	+55

After all DTGs are entered, you can uncheck the "No Critical DTG" button which automatically selects the first segment and recalculates times based on that segment.

Critical: 090800Z JAN 90

Segment	Critical?	Effective	Expiration
1	•	:00	:10
2		:05	:25
3		:25	:50

This last example shows the actual times which are really equal to the Critical DTG added to all effective and expiration times as shown.

Segment	Critical?	Effective	Expiration
1		090755Z JAN 90	090805Z JAN 90
2	•	090800Z JAN 90	090820Z JAN 90
3		090820Z JAN 90	090845Z JAN 90

Due to different protocols, this geometry cannot be sent to any TACFIRE device.

D. Airspace Coordination Area (ACA).

An ACA while effective, cannot be fired into or through without coordination with the establishing unit of the geometry. The ACA can be any shape, but TACFIRE devices (IFSAS, BCS, etc.) which can receive an ACA require it to be a rectangle.

E. No Fire Area (NFA).

An NFA can be any shape area which, while effective, cannot be fired into without coordination with the establishing unit of the geometry. Due to different protocols, this geometry cannot be sent to any TACFIRE device.

F. Restrictive Fire Area (RFA).

An RFA is a restrictive fire measure which, while effective, restricts specified munitions, fuzes, caliber of weapons and/or fire support systems from firing into it without coordination with the establishing unit of the geometry.

G. Free Fire Area (FFA).

An FFA is permissive measure which, while effective, allows fires into without coordination. Any violated restrictive measures (NFAs, ACAs etc.) will still cause coordination. Due to different protocols, this geometry cannot be sent to any TACFIRE device.

H. Dead Space Area (DSA).

A DSA is a geometry that, while effective, causes specified units associated with the DSA to be considered incapable of firing targets within the area. This would be used to specify masking caused by terrain or other features.

I. Coordinated Fire Line (CFL).

A CFL is a line beyond which conventional surface fire support means (i.e. FA, mortars, NSFS) may fire at any time within the ZOR of the establishing HQ of the CFL (or within ZORs of units subordinate to or supporting the establishing unit of the CFL) without additional coordination.

J. Fire Support Coordination Line (FSCL).

An FSCL is a permissive measure beyond which air to surface fires may be delivered without coordination with the establishing HQ of the FSCL. However, all surface to surface fires beyond the FSCL do require coordination with the supporting tactical air unit (at the establishing unit for the FSCL).

K. Restrictive Fire Line (RFL).

An RFL is a line which is generally placed between converging friendly forces. Fires across the line require coordination with the responsible unit of the ZOR which lies just beyond the RFL.

L. Target Buildup Area (TBA).

A TBA is established when the commander wants to allow a certain number of targets (of a specific target type) to be acquired in a specific area before commencing engagement of targets in that area. The target location, target type, target strength, and Operational Until Time for the current mission are compared with guidance and information associated with each Target Buildup Area established for the current situation. A mission fails the TBA check if all of the following are true:

- The target location for the current mission is located within the target buildup area.
- The total strength of targets of this target type reported within the target buildup area plus the strength reported with this target does not meet the strength set for the TBA has not been met.
- The Current Time - Operational Until Time period for the target overlaps the Effective Time - Expiration Time period for the target buildup area.

When the TBA check is passed, the mission processing operator is alerted and provided options to deny or process the mission.

NOTE!
Target Buildup Area checks are only performed if the incoming message is a Fire Request.

IMPORTANT!!
When AFATDS checks for FSCM violations, the "Operational Until Time" (The latest time the target can be attacked) is considered. For example, NFA 3 is in effect from 1200 - 1500 hours. The current time is 1150 hours. Target AA1000 falls in NFA 3 and has an operational until time of 1215 hours. AA100 will still require coordination due to NFA 3 (This is because AA1000 may be fired during the effective time window for the NFA.). Similarly, a CFL that will not be in effect for the entire duration (current time to operational until time) of a fire mission will not excuse ZOR violations for that mission. In other words, the mission must be expected to be fired while the CFL is active in order to avoid a ZOR violation.

M. PAH/ TAH.

PAH stands for “Platoon Air Hazard”. TAH stands for “Target Air Hazard”. These are special geometries created in conjunction with ATACMS missions. They are established to warn friendly aircraft to stay away, because the airspace defined by the PAH/TAH is about to be used for a missile launch (or payload impact, in the case of the TAH). AFATDS automatically forwards these geometries to certain OPFACs in the mission chain, and to OPFACs designated in the PAH/TAH distribution guidance. At a minimum, these geometries should be sent to the OPFAC responsible for coordinating airspace in the AFATDS OPFAC’s zone of operations.

NOTE!

Other than distributing the information, AFATDS performs no automated processing with regards to the PAH/ TAH. AFATDS does not track flight paths for friendly aircraft, so it will not provide an alert when a flight path crosses into a PAH or TAH. It will not check to see if existing air corridors or air space coordination areas overlap a PAH/ TAH. The operator must visually inspect the map display to see if such overlaps occur.

Geometries Categories

The following categories of geometries are used frequently in AFATDS. These are used to build overlays, send plans and Current and to implement plans. This table lists all geometry types in each geometry category.

Geometry Category	Geometry Type
Movement	**Area Geometry**
	Ammo Holding Area
	FASCAM Safety Zone
	Line Geometry
	Ford Crossing
	Lane Crossing
	Point Geometry
	Traffic Control Point
	Firing Point
	Launch Point
	Hide Point
	Obstacle Point
	Bypass Difficult
	Reload Point
NBC	**Area Geometry**
	Chemical Contamination Area
	Biological Contamination Area
	Radioactive Area

Geometry Category	Geometry Type
FSCM & Target Areas	**Area Geometry**
	Air Corridor
	Airspace Coordination Area
	No Fire Area
	Restrictive Fire Area
	Free Fire Area
	TAI
	Target Build-Up Area
	Target Value Area
	Dead Space Area
	Zone Of Responsibility
	Line Geometry
	Coordinated Fire Line
	Fire Support Coordination Line
	Restrictive Fire Line
	Down Range Mask Area
Sensor Zones	**Area Geometry**
	CFF Zone
	ATI Zone
	Censor Zone
	Critical Friendly Zone
Battle Areas	**Area Geometry**
	Close Battle Area
	Deep Battle Area
	Rear Battle Area

Geometry Category	Geometry Type
Boundaries	**Line Geometry**
	Boundary Lines
Situation	**Area Geometry**
	Position Area
	Limited Access Position Area
	Strong Point Area
	Shorad Zone
	Vulnerable Area
	Assault Objective
	Assault Position
	Assembly Area
	Attack Position
	Battle Position
	Brigade Support Area
	Division Support Area
	Engagement Area
	Pickup Zone
	Landing Zone
	Drop Zone
	Amphibious Object Area
	Beach Support Area
	Combat Service Support Area
	Forward Arming and Refueling Point
	Helicopter Lane
	Landing Zone Support Area

Geometry Category	Geometry Type
	Mine Field
	Obstacle Area
	Fire Support Area
	Target Geometry
	General Area
	Position Air Hazard
	Target Air Hazard
	Missile Flight Path (Computer Generated)
	Line Geometry
	FLOT
	Line Of Contact
	Line Of Departure
	Line Of Departure/Contact
	Obstacle Line
	Fortified Line
	Airhead Line
	Bridgehead Line
	FEBA
	Holding Line
	Limit Of Advance
	Phase Line
	Probable Line Of Deployment
	Crossover Line
	Direction Of Attack
	Final Coordination Line
	Main Supply Route
	Light Line

Geometry Category	Geometry Type
	Axis Of Advance
	General Line
	Feint
	Force Beachhead Line
	Main Attack
	Mine Field Line
	Supporting Attack
	Point Geometry
	Coordinating Point
	Contact Point
	Air Control Point
	Communications Check Point
	Linkup Point
	Passage Point
	Point Of Departure
	Popup Point
	Rally Point
	Rendezvous Point
	Ambush Point
	Bridge Site
	Decon Point
	General Point
	Fire Support Station
	Ford Crossing Point
	Initial Point
	Linkup (Marine)
	Overhead Point

Geometry Category	Geometry Type
	Penetration Control Point
	Radar Point
	Rally Point (Marine)
	Reduce Width Point

Geometries

Geometry Data from External Systems

The JMCIS system is currently unable to identify specific types for geometry objects. As a result, AFATDS treats all geometry objects received from JMCIS as “general” geometries, (lines, circles, rectangles, and irregular polygons). Unlike fire support coordinating measure (FSCM) geometries, such as the CFL and RFA which trigger coordination requests during mission processing, general geometries do not cause any special processing at AFATDS. They are simply displayed. This is true even if the JMCIS operator assigns a name to them which imply that they are FSCMs. A JMCIS geometry with a name of NFA PURPLE is still just a general area. It will not trigger coordination requests.

If the JMCIS operator wants to identify a genuine FSCM, and have it entered in the AFATDS system, he must request that the AFATDS operator to re enter the JMCIS object in AFATDS, specifying the appropriate geometry type (NFA, RFA, FSCL, etc).

Trigger Events Overview

A. General. Trigger events assist the commander in synchronizing fire support operations with the current tactical situation. Once a trigger event has been created in the OPFAC's current situation, AFATDS will monitor all changes for units, geometry and targets and alert the operator when the trigger event has been "Tripped". The operator can set up a Trigger event and specify specific actions for automatic execution as well as textual instructions to be displayed when that Trigger is Tripped. Normally, the trigger event function is used when the operator desires to be alerted when a specific or general event has occurred. The operator creates these triggers with some intent to do some task in response to the trigger being tripped. Actions may be set for the following:

1. Implement Plan Phase
2. Execute Fire Plan
3. Initiate Fire Mission On
4. Activate Geometry
5. Transmit Message
6. Send Move Order
7. Send Sensor Order
8. Send Posture Order

B. Trigger Events-Example 1. Figure 33 below shows the use of the trigger capabilities to monitor the enemy situation in order to determine which course of action he will take and to destroy the enemy at the right time and place.

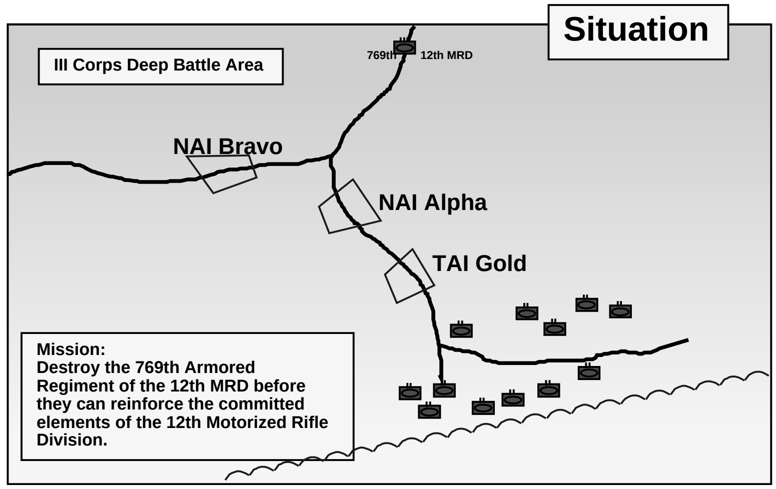


Figure 33. Use of Trigger Events to Monitor Enemy Situation

The Corps Commander has issued his mission statement (see above figure). The G-3 has tasked the Corps FSE to execute the mission. Since the FSE is executing deep fires, an ATACMS capable Corps MLRS unit (A 2/627 FA) has been allocated (OPCON) to the Corps FSE. A 2/627's "Supported HQ" is the Corps FSE. This relationship gives the FSE direct access to the ATACMS assets in support of the Corps (enabling faster reaction times and closer management).

The 769th AR of the 12th MRD is currently located well north of the committed enemy forces. The Corps Tactical Operations Center has determined that the 769th AR's mission is likely to reinforce the committed forces of the 12th MRD. There is a possibility, however, that the 769th will head west at the major road junction and proceed into an assembly area. In order to automate the synchronization of the Corps Fire support assets with the Maneuver Commander's directives, the Corps FSE (using AFATDS) performs the following:

- NIA's Alpha and Bravo are entered into the database. These NAIs are placed over the possible routes that the 769th may travel. If the 769th is reported in one of these areas, his chosen course of action will be clear (either he is heading west or reinforcing the main elements).

- A preplanned posture order is created for A 2/267. This posture order tells A 2/267 to upload 2 ATACMS-BAT munitions in a two minute response time and to displace to location 6/72420/0311/0/10.

- TAI Gold is created to facilitate engagement of the enemy should he attempt to proceed south on the main road.

- A target (SB1000) is planned along the road in TAI Gold. This target is the engagement point for attacking the 769th as they proceed through TAI Gold. The operator adds it to the "On-Call" target list and specifies "ATACMS-BAT" as the preferred munition. Note that the mission is <u>not yet initiated</u>.

- A message is sent to the Corps Intelligence Cell (equipped with ASAS) to request that any change to the 769th location be reported to the Corps FSE. ASAS will report enemy unit updates with the "Enemy Interoperability Message". AFATDS will automatically update enemy unit data based on the information in this message.

- The Corps FSE operator now creates the following Trigger Events:

Trigger:	<u>NAI Bravo</u>:
Event:	"<u>769th</u>" is reported <u>In</u> <u>NAI Bravo.</u>
Alert Text:	"Notify G-3. 769th heading west, halt further actions to engage 769th in TAI Gold".

Trigger:	<u>NAI Alpha</u>:
Event:	"<u>769th</u>" is reported <u>In</u> <u>NAI Alpha.</u>
Action:	Send posture order to A 2/267.
Alert Text:	"Notify G-3. 769th heading to reinforce main elements of 12th MRD.

Trigger:	<u>TAI Gold</u>:
Event:	"<u>769th</u>" is reported <u>In</u> <u>TAI Gold.</u>
Action:	Initiate fire mission on target SB1000.
Alert Text:	"Notify G-3."

As the situation develops, the Intelligence Cell forwards updates on the 769th to the FSE. When the 769th enters the appropriate geometries, the trigger trips, the operator is alerted and presented with the previously entered instructions.

As soon as the 769th is reported in NAI Alpha, the operator is alerted. Following the instructions presented with the alert, he notifies the G-3 and "Executes" the action (automatically sending the posture order).

The MLRS unit reports his unit status (updating the map and alerting the operator). The MLRS unit is now in position to attack the target in TAI Gold.

When the 769th is reported in TAI Gold, the operator is again alerted and the associated action and instructions presented with the alert. The operator again notifies the G-3 and "Executes" the action (initiating the fire mission on the enemy unit as they pass through the TAI). (AFATDS will attempt to generate ATACMS-BAT options since this was the munition specified for the targets). The missions are sent (with a "Warning Order" method of control) to the MLRS unit. Coordination requests (if required) are automatically sent to appropriate agencies and PAH & TAH geometries are automatically distributed. The MLRS unit receives the command and it is automatically forwarded to the launchers. The mission is fired - MFRs are automatically produced and distributed and the PAH & TAH geometries are automatically deleted.

Note: The targets established by the operator to engage the enemy in TAI Gold can be refined if better location data becomes available. This is because AFATDS allows the location of Active missions to be changed if the mission is in a "Warning Order" status. If AFATDS receives updated information on these targets (from some sensor or from the operator), then AFATDS will modify the location and send the updated target information with the "Fire" command issued when the mission is to be fired.

C. Trigger Events-Example 2. Figure 34 below shows the use of the trigger capabilities to monitor the friendly situation in order to synchronize fire support with the maneuver operation.

The Commander has issued his mission statement (see figure below). The FSE has already created a 2 phase FS Plan (Plan Red) reflecting the maneuver commander’s concept of the operation. Phase 1 is currently being executed. The original maneuver scheme specified that the priority of fires and targeting guidance were to be modified upon start of phase 2 (Plan Red was built to reflect this directive). Further, the commander has established Phase Line Fox as the decision point at which phase 2 activities go into effect.

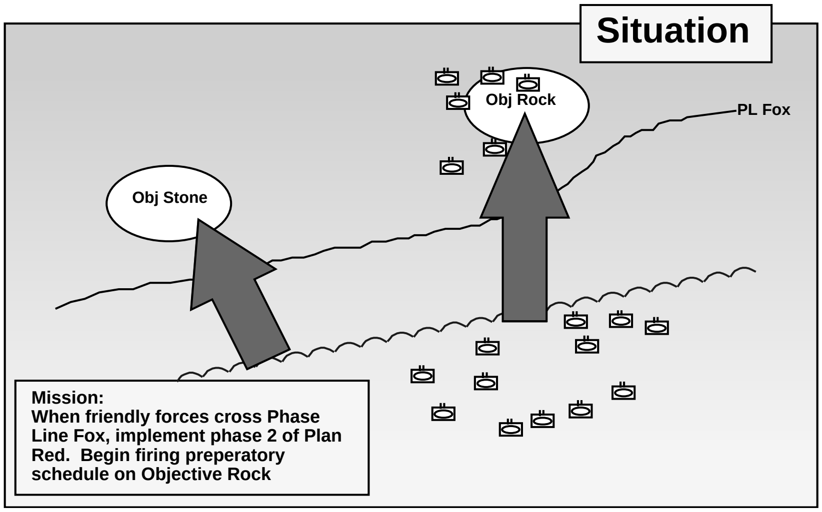


Figure 34. Use of Trigger Events to Monitor Friendly Situation

The commander has also requested a 15 minute preparatory schedule of fire to be conducted upon the start of phase 2. In order to automate the synchronization of the Fire support assets with the Maneuver Commander's directives, the FSE (using AFATDS) performs the following:

- Creates a Current situation Fire Plan (Fire Plan "Rock-Prep") in accordance with the commander's guidance (duration 15 minutes, On-Call, targets include Objective Rock enemy elements). The FSE (or the supporting FA CP) schedule the fire plan to ensure supportability and save all changes back to the fire plan.

- Prepares a Free Text message (pre-addressed to supporting and subordinate units) named "Phase 2 FRAGO" and places it in the Draft folder. The PTM states: "Implement Plan Red Phase 2. H-Hour TBD. Fire Plan Rock-Prep to be executed by this HQ"

- The Corps FSE operator now creates the following Trigger Event:

Trigger:	Phase 2:
Event:	"Any Friendly Unit" is reported Forward of PL Fox.
Action:	Execute fire plan Rock-Prep.
Action:	Implement Plan Red Phase 2.
Action:	Send PTM "Phase 2 "FRAGO".Alert Text: Implement Plan Red-Phase 2, H hour =current system time.

As the situation develops, the maneuver elements report their positions (normally to the MCS system) and MCS updates the supporting FSE using the "Resources-Location" message). AFATDS automatically processes these unit location updates. Meanwhile, Forward observers are also reporting their location updates through the fire support chain. When any of these updates contain a friendly unit location that is forward of Phase Line Fox the trigger trips the operator is alerted and presented with the previously entered instructions.

The operator follows the instructions in the tripped trigger alert and selects "Execute" on the tripped trigger alert. This causes the fire plan to be fired and will prompt the operator to specify H hour and implementing instructions for the plan. The previously entered free text message and enters the appropriate time into the message (replacing the "TBD") and sends the message. The fire support elements are now "synched" with the maneuver situation.

D. Trigger Events - Specific Capabilities.

1. Up to 200 trigger events may be created (in current situation only).

2. The Trigger rule may be based on target or unit data being reported in relationship to the specific (by name) geometry. Target and unit data are further classified in the following categories:

    - Any Friendly unit
    - A specific friendly unit (operator must select a specific unit ID)
    - A type of friendly unit (e.g. "observer", "Naval Ship" etc.)
    - Any Enemy unit
    - A specific Enemy unit (operator must select a specific unit ID)
    - A type of Enemy unit (e.g. "Assembly Area-Troops", "Artillery, Heavy-SP" etc.)
    - A specific target number
    - A target type (e.g. "Missile, Heavy", "Tank-Medium")

3. Trigger rule may be based on a specific time (a rule based on time will simply "trip" when the system clock reaches the time specified. Time based rules may also have a "trip interval" (e.g. 6 hrs & 30 min). When the time based trigger trips and the operator is alerted, he may "re-set" the trigger and AFATDS will automatically calculate a new trip time based on the previously entered time interval. For example, the trigger rule was to trip at 011500ZJul98 with an interval of 4 hours. At 1500 hours on 1 July, 1998 the trigger will trip and inform the operator. If the operator elects to "re-set" the event, AFATDS will add 4 hours to the initial trip time (1500hrs) for a new trip time of 1900hrs.

An example of a time based trigger event would be:

Trigger:	Report Reminder:
Event:	"011700ZMay98" "Re-Trip in 24 hours"
Alert Text:	"Send Daily status report (Basic unit Info and Detailed Equipment info) to Higher HQ"

4. For each trigger event the operator can enter text information (up to 100 characters) that is displayed along with the trigger rule & the data that caused the trigger to trip.

5. When a Trigger event is tripped, the workstation that created that trigger event is presented the alert (applicable to multi-workstation OPFACs).

6. Multiple actions may be associated with each trigger event. These actions are automatically carried out by AFATDS when the operator selects "Execute" on the tripped trigger event.

Mission Processing Overview

In AFATDS mission processing begins when a fire mission is received or initiated at an OPFAC. Examples of this are a CFF received from an observer, an ATI originating from a radar or just a mission entered at the keyboard. While a mission is in progress, the mission can be found on the Active target list; during this time, the operator can send and receive messages about the mission and get status on the mission. Mission processing on a mission ends when an End of Mission (EOM) or Mission Fired Report (MFR) is received or generated. The mission then becomes inactive and gets transferred to the Inactive target list.

Procedures for initiating missions in AFATDS can be found in Appendix D, "Mission Procedures".

A. AFATDS Mission Processing. When received or initiated at an AFATDS, a mission will be assigned a target number and will have a mission value calculated. It will then go through a series of “filter” checks (e.g. duplication, TSS, etc.) to see if it actually qualifies as a fire mission; if it passes these filters then a set of munitions which could be used to shoot the mission will be generated from the guidances as well as from the munitions requested in the call for fire. A list of units which are both capable and available will also be generated. This will be done based on that OPFAC’s Unit Organization (from command and supported HQ’s you entered for units in Current) as well as observer specified and guidance specified entries. Then, the munitions will be put together with the available units to see which units can actually shoot the mission given the munition requirements. Finally, this set of units paired together with munitions will be ordered (i.e. sorted) such that the best choice units are listed first. If this mission trips operator intervention criteria, the number one solution will be recommended to the operator; if not set up for operator intervention, the first choice option will automatically be pursued.

IMPORTANT!!

Target data that fails TSS will be passed to the target generation functions. See Target Generation section.

IMPORTANT!!

While a mission is active at your OPFAC, it will be shown as part of the count in the mission toolbar window. If the mission was sent out of your box as an "OTF" or Fire Order" it will be counted in the "OTF/FO" count. Otherwise it will be counted in the "Other Active Mission" count. Note that these counts are updated on a periodic basis (based on receipt of MFRs, Deny messages etc.). For this reason, the counts displayed on this window may sometimes "lag" behind the actual active mission status as displayed on the active target list. When in doubt, you should always use the active target list as your source for the most accurate active mission count.

B. Automatic Target Numbering. AFATDS allows several blocks of target numbers to be set up for your OPFAC. When a mission comes into the OPFAC without a target number, it will automatically be assigned the next target number in the block. Target numbers will be recycled after the last one is reached. If most or all target numbers are used, an alert will be given to the operator allowing him to go set up more target numbers. If no target numbers are setup and a mission needs a target number, the operator will be alerted and asked to go set up a target numbering block.

NOTE!

When creating target numbers, do not use "I" and "O" in your target numbers. Some of the systems that AFATDS interfaces with will not accept them.

Entering Target Blocks.

No.	Action
1	On the Current Situation window, select "Targets | Target Numbering". The Target Numbering window will open.
2	Enter at least one target number block. If desired, set the Alert Threshold % for running out of target numbers and check the Enable Alert button.
3	Select OK to close the Target Numbering window.

C. Active vs. Inactive Missions. While a mission is in progress, it is said to be Active. While active, a target looks bolded on the map and can be found on the Active Target List. While on this list a number of messages can be initiated for the target. For example, Adjusts can be done, an EOM can be generated or a Record as Target generated. Generally, subsequent messages (Adjust, RFFE, EOM, etc) will be sent by the fire mission initiator and the AFATDS operator should not interrupt any message generated for an active mission except in extreme circumstances or when he has initiated the mission at the AFATDS OPFAC. Also while an active target, the mission can be statused and traced. This allows an operator to quickly gain a record of the missions history as well as its current status at other OPFACs.

Once a mission is completed and an EOM or MFR is received, the target will be transitioned to an Inactive target. This will change its appearance on the map to a normal target symbol and will move it to the Inactive Target List. The Inactive Target List can be purged to rid the system of all old missions. An inactive target can also have another mission initiated against it.

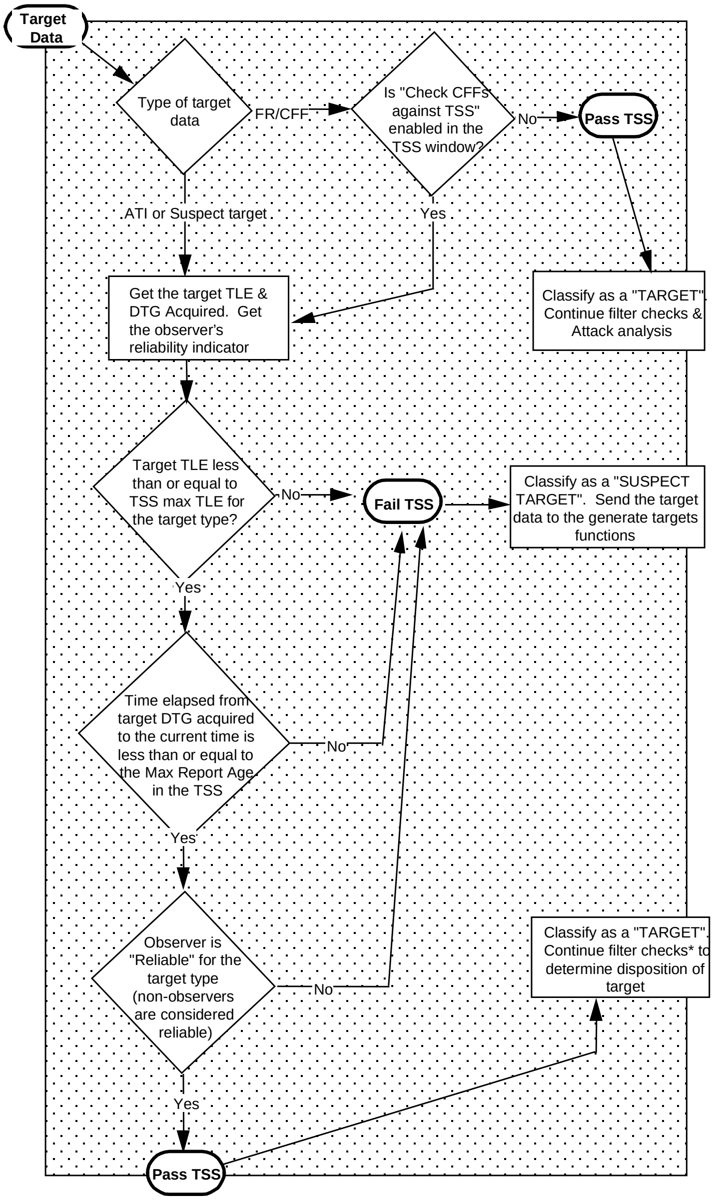
D. ATIs vs. CFFs: ATIs are always checked against TSS. If the ATI fails the TSS guidance it will be considered a "Suspect" target and be sent to the target generation function for further processing. CFFs may be checked against TSS if the operator elects to do so (simply by selecting the "Check CFFs against TSS" option on the TSS guidance window). CFFs failing TSS will likewise be sent to target generation as a suspect target. If the "Check CFFs against TSS" option is not selected, ALL CFFs WILL PASS TSS. Once the target data has been checked against TSS, AFATDS will determine what to do based on whether the target originated as an ATI or as a CFF. CFFs will be compared against other target filters (exclusion, duplication, IEW coordination, Target buildup areas) based on the role of the processing OPFAC (see the guidance section of this manual). The CFF will then undergo attack analysis. ATIs will undergo the same filtering checks, however, AFATDS will not undergo attack analysis unless certain conditions in the guidance are met. If an ATI passes TSS but does not turn into a mission, AFATDS will automatically determine the ATI target's disposition and place it on the appropriate target list (Planned or Inactive). The following flow chart depicts the logic that AFATDS uses when determining which target list to place the ATI on and whether to send an ATI report to IEW (ASAS).

E. Target Filters. In the guidance section, we see how certain guidances are used to "filter" missions from being shot. The guidances which can be used to filter missions are:

- Target Selection Standards (TSS) -- Max TLE and Max Report Age.
- Target Management Matrix (TMM) -- Excluded targets, IEW coordination
- Target Duplication

Another check can exclude targets from being shot. This check is a geometry called Target Buildup Area (TBA). A TBA is an area geometry with which a target threshold can be set; as targets are acquired in the TBA, they will not be shot until the number of targets acquired reaches the threshold. This allows a commander to set up an area which requires a certain number of targets of a given target type to be acquired before commencing engagement of any targets within the area.

NOTE!
The Target Buildup filter checks incoming fire requests only. If the mission is received as an OTF or FO from another OPFAC, the filter is not used.



* Note. Remaining filter checks consist of target duplication check, target buildup area (TBA) check, and IEW coordination check

Figure 35. TSS Check

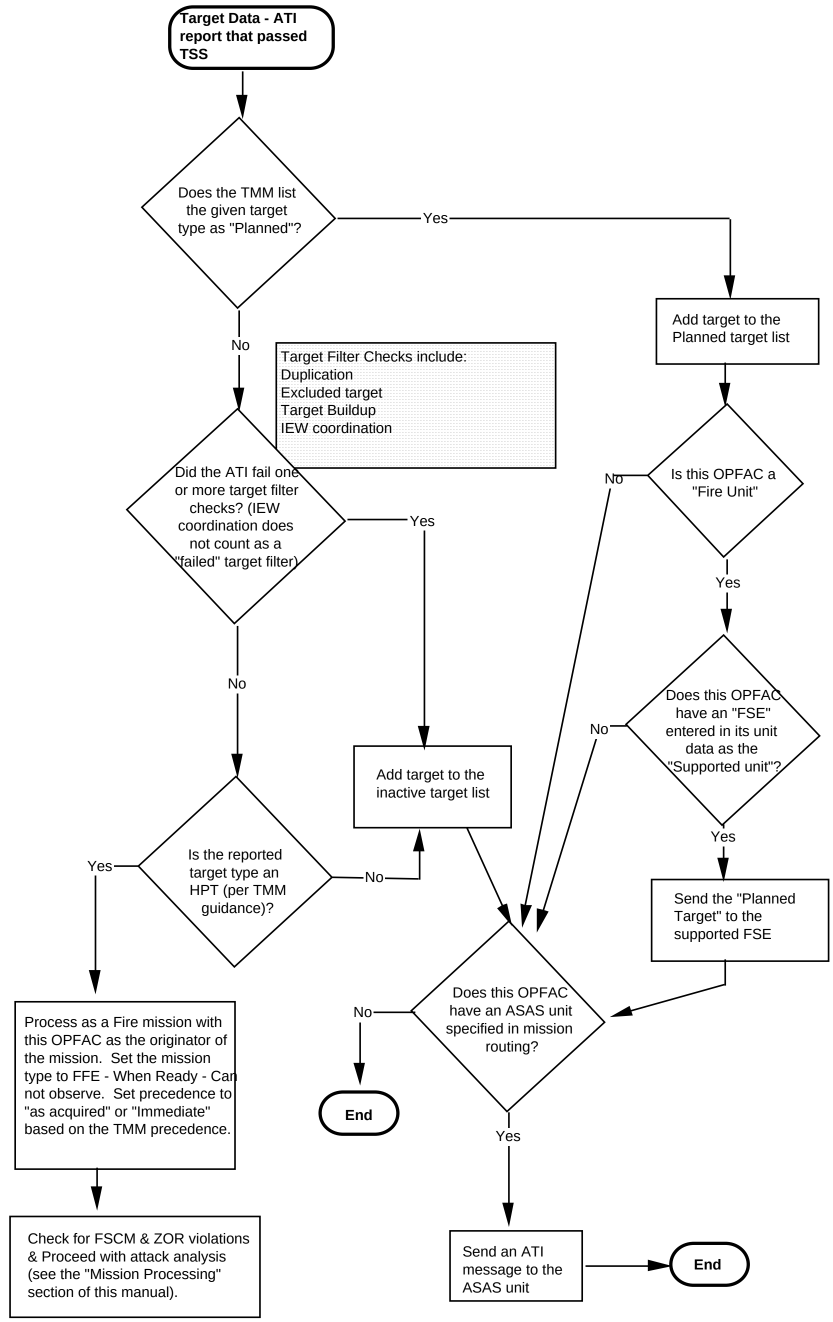


Figure 36. Target Filtering for ATIs That Pass TSS

F. Forward Observer / FIST Messaging. When a call for fire is received, AFATDS uses the observer Unit Reference Number (URN) to determine the observer Master Unit List (MUL) number for mapping into the fire request / order to fire. When a URN is not provided for the observer or FIST in the Call For Fire (CFF) message, AFATDS must use the observer numbers in communications configuration at the receiving OPFAC to determine the correct observer and FIST unit. Therefore, the OPFAC interfacing with a given FIST will need to have that FIST and that FIST's observers in the communications tables – otherwise the message will fail receipt. This is the first procedure performed when AFATDS processes a fire request. Therefore, the mission data that is later transmitted between OPFACs will already have an observer number and MUL number and (if received in the original CFF) a FIST number and MUL number. When other AFATDS OPFACs send FR/OTF/FO messages related to this mission, they will use the observer and FIST number in the mission data (rather than using the communications tables) to populate these values in the external message. This will allow OPFACs that do not have the observer in the communications tables to process the mission.

G. Intervention Points. AFATDS allows the operator to view and make decisions on every mission which comes into the OPFAC. It also provides the capability to perform mission processing automatically with no operator handling as well as handling some missions automatically while giving the operator handling on only certain missions (management by exception). This feature is called INTERVENTION. The operator can set up Intervention Rules which allow given target conditions to cause an Intervention Point to be generated when the mission is at the Intervention Point, the operator will be given a recommended attack option and it can be accepted, rejected and changed or the mission can be denied or considered unsupportable. In the Intervention Point, all capable and non-capable attack options will be shown for review. Non-capable options will show why they are non-capable. This allows some degree of troubleshooting by giving the operator enough information to either go find the problem (why a mission cannot be shot by a given unit) or to understand why that attack option is not the best choice.

H. Unsupportable Targets. When an element processes a mission, and no capable attack options can be found, the target will be either denied or considered unsupportable.

- If intervention is ON, the recommendation will be DENY, NO CAPABLE OPTIONS. If the operator selects the "Unsupportable" button, the mission will be sent to his supported HQ.
- If intervention is OFF and no capable options exist, the mission will be placed in the deny section (thumbs down) portion of the Mission Toolbar.

If the operator selects "Options/Recalculate Fire Mission", AFATDS opens the "Initiate Fire Mission" window. This allows the operator to make modifications to the existing target information so that it may be selected as a capable option.

I. Check Firing/Cancel Check Firing.

AFATDS provides the operator the ability to halt artillery firing at any time on any single target or all targets. Due to the priority of this type message an in-depth understanding of the process is required. The following is a narrative on the process of Check Firing and Cancel Check Firing:

- CHECK FIRE by target number. Any OPFAC or sensor may initiate the CHECK FIRING message on a selected target from any AFATDS workstation. Other digital systems such as FED, FOS, IFSAS ,etc. may also send a CHECK FIRE by target message to AFATDS. The CHECK FIRING message (by target number) will follow the Mission Path of the referenced target to all OPFACs involved in the Fire Mission Chain.

- CHECK FIRE ALL. Any OPFAC may create and process ("OK") a "CHECK FIRE ALL" message. A CHECK FIRE ALL will immediately cease all mission processing activities at the OPFAC. Also, a CHECK FIRE ALL message will be automatically sent to all supporting and commanded fire units and FA CPs. These OPFACs will automatically process the message and forward it to their subordinate fire units / FA CPs. The OPFAC initiating the CHECK FIRE ALL message must have units identified in its Commanded and Support fields or the message will fail.

- Any operator may request Check Firing by using the "SEND" button instead of the "OK" button on the Check Firing form. This will not cause the CHECK FIRE to be processed by his OPFAC. Instead, the unit that receives the CHECK FIRE will automatically process and disseminate the message.

- To cancel Check Firing, any OPFAC can initiate the Cancel Check Firing message and it will be distributed in the same way as the initial Check Firing message as in initiating Check Firing.

J. Mission Coordination. During mission processing, AFATDS determines whether coordination is required prior to engaging a target. Coordination may be required for either a geometry violation, IEW coordination requirement or due to Clearance of Fires (CoF) criteria established by the operator.

- Geometry violations. The mission may require coordination due to FSCM or ZOR violations. See the "Geometries" appendix of this manual for more information about how these checks are conducted.

- IEW Coordination. The mission may require coordination due to the "IEW Coord" indicator being set for the mission's target type in the TMM. When this happens, coordination with the IEW unit entered as the "ASAS" Unit in the mission info routing form is required. If there is no ASAS unit entered, AFATDS will not require coordination with IEW (even if the TMM IEW indicator is set).

- CoF Requirements. The mission may require coordination due to the CoF criteria in effect at the OPFAC at the time the mission is processed. CoF criteria is established to allow other battlefield agencies (e.g. "Battlefield Coordination Detachment" (BCD), "Air Defense Element" (ADE), etc.) to clear engagement of selected targets.

- Sending Coordination messages. When AFATDS (or the operator at the intervention point) selects an attack option that requires coordination, AFATDS automatically sends coordination requests to the unit(s) that are responsible for the violated FSCM/ZOR, to the ASAS unit (if applicable), and/or to unit(s) as required by the CoF criteria. The FR/OTF/FO will not be sent until all coordination responses have been received & approved (or overridden by the operator). If all responses have been received and one or more is "denied", then AFATDS will place the mission in the thumbs Down (deny) icon on the mission toolbar (reason = "coordination failure").

IMPORTANT!!
If the mission has a method of control of "Warning Order", AFATDS will send coordination requests (as normal) but will also send the mission through the mission chain with coordination "requested". This allows the fire unit(s) to prepare to fire the mission, thus providing a rapid response when the coordination activity is complete.

IMPORTANT!!

If you see an alert stating "Manual Coordination Required" when processing a mission, this means that AFATDS was unable to check the mission against FSCMs and Clearance of Fires criteria. This is usually caused by one of the following.

1. One or more of your current situation FSCMs has an "Establishing" (or "Responsible") unit that does not exist in the current situation. Solution - Add the unit to current and reboot.

2. You had an OPFAC reconfiguration that did not successfully complete. Solution - reboot.

3. Your database is corrupt. Solution - reboot AFATDS and restore a known good database.

- Receiving a Coordination Request. When an AFATDS OPFAC receives a coordination request (either FSCM or CoF coordination) the request will be placed in the RCVD "Handshake" icon on the mission toolbar. Once the "Coordination Requested" form is opened, the operator is presented information about the target and what the requesting unit is expecting to fire on the target. The receiving operator can either “Approve” or “Deny” the request. If the request is approved, a No Later Than (NLT) time and a No Earlier Than (NET) time may also be specified by the operator. Other capabilities related to the receipt of a coordination request include:

  - The target in the coordination request is placed on the map in an active state (bolded). The target will not be placed on the active target list.

  - The target in the coordination request is checked against other active targets at the OPFAC to determine if it is a duplicate of an another target that is already being fired. The operator is provided the results of this check on the "Coordination Requested" window.

  - Information (location, size, strength etc.) on the target is available for review

  - When the request for coordination is due to a geometry violation, the operator is provided a list (geometry type -- geometry name) of those geometry(s). More information about the geometry(s) may be accessed directly from the coordination requested form.

- When an CoF coordination request is displayed to the operator at the receiving OPFAC, the Geometry type column will display “Al” (a default value for the field) and the Geometry name will be “CoF” (Clearance of Fires).

K. Clearance of Fires (CoF) Criteria. The operator may establish coordination criteria that tells AFATDS what target types require coordination with specific battlefield elements. This capability supports the Corps FSE's need to coordinate missions among other agencies that have a "say" in when and if a given target should be fired. To support this need, AFATDS provides the following capabilities:

- Agency-Unit ID Mapping. This screen allows the operator to enter a battlefield agency "short name" (like BCD, ACE or some other acronym) and select a unit ID from the current situation unit list to associate with that name. For example, the operator could enter a name of "SOF" (Special Operating Force) and select a unit ID of "145 Sp Forces Det III Corps". The agency name (in this case "SOF") is the unit Identifier the operator will see on the coordination criteria and coordination status screen.

- Coordination Rule. This screen allows the operator to create up to 20 Inter-OPFAC coordination rules. A coordination rule may have the following parameters:

  - Target Type or Target Category or “All” target types.
  - Area geometry in which the target is located or line geometry which is forward or behind the target location.
  - Fire Support System selected to engage the target.
  - Munition Category (e.g. DPICM, ATACMS BAT, etc.) selected to engage the target.
  - Agencies to coordinate that type or category with (or the operator can select “all” which means that target type (or category) must be coordinated with each agency that has an associated unit ID).

- Coordination Status. This screen displays all targets (that are currently active) that have been coordinated (i.e. coordination response has been received) or are in the process of being coordinated (i.e. coordination requests have been sent but no response is back yet). This is the “gumball” screen that depicts the coordination status of each mission. The screen will list rows of target numbers and columns for each agency name for which you have associated a unit ID.

  - When a target is selected on this screen, the operator can view some of the target data (e.g. target location) as well as textual information that was returned with the coordination response. Note that textual information will be displayed only for coordination responses related to Inter-OPFAC coordination (i.e. any text contained in a coordination response for an FSCM or IEW violation will not be displayed to the operator).

- This screen will also have a single column for FSCM & IEW (per TMM) coordination status. Colored gumballs are displayed in each column for each target. Gumball colors are as follows:

Clear	No coordination required
Yellow	Coordination request has been sent but no response has been received (for FSCM column, the gumball will be yellow until all FSCM & IEW (per TMM) coordination responses have been received.
Red	Coordination response was received and was denied.
Green	Coordination response was received and was approved (or the operator "overrode" the coordination requirement).

L. Attack Analysis.

Attack analysis considers the various parameters of a given fire mission (mission type, observer requests, target location), the target and attack guidance in effect (FS system tasks, munitions restrictions), the allocated attack units within FA, Mortar, NSFS, Air, and Aviation systems, battlefield geometries (FSCMs), and attack option ranking criteria to develop attack options to achieve defeat criteria on the target. AFATDS then recommends and initiates execution on one of the options (as evaluated by the ranking criteria). The operator may choose one of three levels of attack analysis:

- FS System Attack Analysis
- Unit Attack Analysis
- Detailed Attack Analysis

1. FS System Attack Analysis. FS System Attack Analysis allows an FSE to perform attack analysis only to the level of detail necessary to select a FS system and get the mission to the appropriate unit for further processing. This level of analysis is expected to be used in an FSE. When performing FS system attack analysis, detailed unit information (locations, munitions status, active missions at the unit, etc.) is not required. The comprehensive analysis (determining actual range, determining munitions quantity to fire on a target to cause 30% effects, etc.) is performed by the tasked FS system. An FSE uses FS System Attack Analysis and selects FA cannons as a system, the

mission is given to the FA unit (unit that is specified to handle missions assigned to FA) for further analysis and execution. The FS attack guidance's are used to support this analysis.

Example: A Fire Mission is received or initiated at an FSE. Based on all previously entered guidance, the attack option will determine a weapon system and munition to successfully attack the specific target type, and recommend the OPFAC to receive the mission.

NOTE!
If the OPFAC has fire units in direct support, or directly subordinate, AFATDS always performs detailed attack analysis for these units, regardless of the attack analysis level selected.

NOTE!
At a minimum, FS system attack parameters guidance must be established at any OPFAC utilizing FS system attack analysis. Failure to establish this guidance will cause the OPFAC to generate only black options (no available units).

2. Unit Attack Analysis. Unit Attack Analysis allows an OPFAC to conduct more detailed attack analysis using 'rollup' unit information. This level of analysis would normally be used in higher level FA CPs (CORPS ARTY, DIVARTY, and FA BDE). Fire units directly supporting or commanded by the OPFAC performing the analysis are analyzed using unit data (location, munitions capabilities, operational status, etc.) to determine if they can attack the target and achieve the specified defeat criteria. Fire units that have an intermediate FA CP between them and the OPFAC performing the analysis are not analyzed in detail. When an intermediate FA CP exists, AFATDS simply determines if the unit (e.g. FA Brigade, DS Battalion), based on a set of general capabilities, can attack the target. For example, a DIVARTY CP (having an MLRS fire unit directly subordinate and also having three subordinate FA Battalions) performing unit attack analysis would analyze the MLRS unit in detail by using that unit's location, munitions status, response time, etc. to determine its capability to attack a given target. The subordinate FA battalions are analyzed based on the aggregate capabilities of the battalion's fire

units. This data is maintained and sent with the BN CP’s unit data. The detailed analysis would then be handled by the FA battalion to which the mission was assigned. The DIVARTY would not analyze all 18 fire units individually, only to have the mission re-analyzed at the FA battalion that was ultimately tasked. This reduces the amount of unit data that must be distributed to higher FA CP’s.

IMPORTANT!!

When you run unit attack analysis make sure that you have a subordinate or supporting FA CP and roll-up data on that FA CP is available at your OPFAC. You can tell if roll-up data is available by viewing the FA CP’s detailed information window to see if one or more fire units are listed in the "units rolled-up" section. If this section is blank, have the FA CP send you his basic unit data, ammunition summary, and weapons summary.

IMPORTANT!!

If you are running unit attack analysis, with a supporting/subordinate FA CP, but no roll-up data, you will get a black gumball (no available units). This is because AFATDS does not recognize the CP as available if no capability information is present.

NOTE!

Massing of subordinate FA/CP’s does not occur with this level of attack analysis!

3. Detailed Attack Analysis. Detailed Attack Analysis allows an OPFAC to determine and evaluate all available individual fire units (as well as collective groupings of fire units for massing) against the given target. This level of analysis is expected to be used in lower level FA CPs (battalions), and at FSEs or higher level FA CPs that command or have subordinate fire units assigned. The operator should consider the tradeoffs (advantages and disadvantages) when electing to run this level of attack analysis at an FSE or higher level

FA CP. This method of attack analysis takes all available fire units and uses each unit's status information to determine attack options. The advantage of this technique is that the possibility of unsupportable missions being returned by a tasked unit is minimized. The major disadvantage is increased processing time required as well as the increased need to distribute data between OPFAC's.

M. Supporting Arms Summary (SASUM) Report.

The Supporting Arms Summary is a report that will provide summary information in a predefined text template that the operator may edit. The SASUM report may be created by the operator at any time. The report may be saved as a text message or sent to another OPFAC.

How it works. When the operator selects SASUM (from the "Messages" option under the "Mission Processing" menu item), AFATDS will display a blank form. When the operator selects "Refresh", AFATDS will:

1. Search the inactive target files to find the number of round expended (by munition type and fire support system) and place these values on the report under the section for the appropriate system.

2. Search the current situation unit list and find all cannon fire units in a "ready" status and place them on the report as "Fire Units Ashore".

3. Search the current situation unit list for all Naval Ship fire units in a "Ready" status and place them on the report as " Naval Ship Units on Station".

4. Display the report (formatted by FS system).

5. Allow operator to edit, save, send or print the report. the operator may optionally delete sections of the report that do not apply to his OPFAC as well as enter any desired additional information. Note that much of the data in the report after the sections headers is blank. This is because these sections of the report refer to data not maintained by AFATDS.

IMPORTANT!!

If you purge your inactive target files and then attempt to generate a SASUM report, the ammunition expended values will be zero. It is recommended that if you want to use the SASUM capability then establish SOP as to when to create it,

who to send it to and when inactive target purging should be performed.

N. Re-coordination on Subsequent Adjustment and Re-Calculation of Missions.

AFATDS functionality allows for re-coordination of an adjust fire mission, if the new aim point violates any FSCM or ZORs (that have not been previously coordinated).

AFATDS will check adjustments for FSCM and ZOR geometry violations. AFATDS will automatically send a coordination request to the responsible unit for a Geometry that was not been previously coordinated during the initial processing of a fire mission. If one or more of the coordination request are denied, the mission will be denied and the mission ended. Once all coordination has been overridden or approved, the adjustment may be forwarded and will not require re-coordination at the next OPFAC. The mission status will reflect the transmission or coordination request. If the mission has a Warning Order method of control, (MLRS) the updated OTF/FO is sent to the next OPFAC even through coordination is pending.

O. Re-calculation of Fire Missions.

The AFATDS operator has the capability to re-calculate any fire mission that comes to the mission toolbar under the intervention point ICON. If interventions are turned off there is no way to access the re-calculate function. This function is located on the OPTION pull-down on the view IP window.

When this is accessed, you will get a initiate fire mission window that will give you the option to change, add or delete the following information:

1. Method of Fire and Control
2. Mission Type (FFE, Adjust. etc)
3. Adjust Shell
4. FFE shell 1 and 2
5. Add or Delete fire units
6. Assign TOT, NET and NLT times
7. Target data

Once the above options have been exercised the mission will be Re-calculated and sent to the intervention window again for the operator to review.

NOTE!

Only missions that stop for intervention can be re-calculated.

P. Meteorological Data (MET).

Field artillery meteorological data (MET) deals with the techniques and procedures for determining current atmospheric conditions. Atmospheric conditions along the trajectory of a projectile or rocket directly affect its accuracy and may cause it to miss the desired point of impact. AFATDS maintains data for six types of METs: CM, TA, CFL, TALL, FO, SO. The operator has the option of saving received MET data as current or as alternate METs and retrieving the saved MET data when needed. MET information may be sent to other OPFACs and certain MET data may be edited by the receiving operator. Receiving OPFACs are notified that new MET data has been received by the "MET" icon count field on the Current Situation Toolbar being incremented.

Mission Processing

Loadable Munition Manager (LMM) and Loadable Munition Modules (LMM)

The Loadable Munition Manager is used to import, activate, deactivate, and delete Loadable Munition Modules (LMM) within AFATDS. The first set of LMMs that have been developed for the system are Army-TACMS Block II (BAT), Army-TACMS Block I / IA (APAM), Army-TACMS Precision Surface Attack Missile (PSAM), and the Enhanced Fiber Optic Guided Missile (EFOGM).

Only the APAM LMMs are automatically activated when the AFATDS software is loaded. Any LMM active at shutdown will automatically be activated when AFATDS is restarted. The operator must access the LMM Manager and activate the other modules before they can be used for processing mission data. If the required LMM is not active and a mission is attempted that requires LMM data, the operator will receive an error message “LMM Not Active”.

The LMM Manager is accessed through the main system menu SYSTEM | ADMINISTRATION | LMM MANAGER. The window provides the operator with the list of modules that are available and whether they are active or inactive. Selecting the module and clicking either the Activate or Deactivate button will change the module to the desired state. The Region button defines regions with unique geographic environmental conditions that affect ATACMS Block II/BAT missions. Select the region that most approximates the tactical environment. AFATDS allows the operator to specify selected variable entries used in generating the Platoon Area/Air Hazard (PAH) for ATACMS munitions, see Figure 38 below. The operator can specify the values for XDIST (platoon operating area radius) and ZALT (PAH ceiling height). The default value for XDIST will be 3000 meters. The default value for ZALT is 5000 meters. The new values will be stored in AFATDS and used anytime an ATACMS mission is computed.

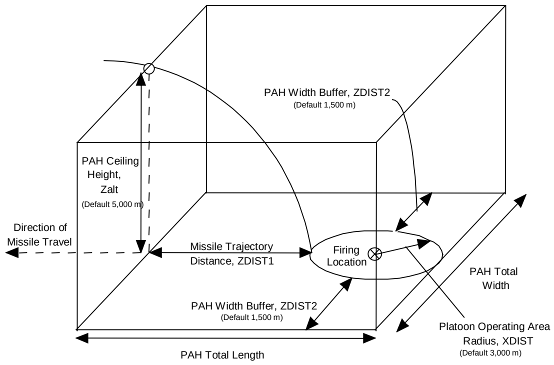


Figure 38. Army-TACMS (ATACMS) BAT / APAM Platoon Air Hazard (PAH)

For the UCU/CCU-2, the LMMs will be imported and removed by the Software Segment Installer. LMM segments will be provided on CD-ROM type media.

Mission Processing
Intervention Rules and Points

Rules which determine the missions you can action, as opposed to those which automatically get processed, are called Intervention Rules. Operator review of missions happens at Intervention Points.

A. Intervention Rules.

Intervention rules specify which conditions a mission must meet to stop the mission for operator review. If a rule specifies that ALL conditions of ALL missions cause a target to be stopped, then ALL missions will be stopped for operator review. If a rule says only ALL conditions for Air targets are to be stopped, then all Air targets will be presented to the operator.

For example, to cause ALL missions to be stopped, put ALL in every condition's box. To cause all Immediate MLRS missions to be stopped, put ALL in every box -- except for FS System, put MLRS, and for Precedence, put Immediate.

The following is a list of all values you can set in order to cause intervention to stop a mission.

Category	**Criteria**	**Other Criteria**
Mission Precedence	Priority	
	Immediate	Up To Mission Value
	As Acquired	Up To Mission Value
	All	
Battle Area	Close	
	Deep	
	Rear	
	All	

Category	Criteria	Other Criteria
Mission Type	Immediate Smoke	
	Immediate Suppression	
	Adjust	
	Fire For Effect	
	Assign FPF	
	Assign Priority Target (CPHD)	
	Continuous Illumination	
	Coordinated Illumination	
	All	
Target Type	Any (see Appx D)	
	All	
Filters (Failure)	TSS	
	Duplication	
	Exclusion	
	IEW Routing	
	Target Buildup Areas	
	Coordination Required	
	All	
Analysis Results	Send Fire Request	
	Send Order To Fire	
	Send Fire Order	
	Deny	

Category	**Criteria**	**Other Criteria**
	All	
Munition Category	Any (by type)	
	All	
Attack Option	FA Cannon	105mm
		155mm
		203mm
	Rocket/Missile	Rocket
	Mortar	
	Air	
	Aviation	
	Naval Gun	5in/38
		5in/54
	Naval Land Attack Missile	
	Naval Cruise Missile	
	All	

To set up or delete an intervention rule.

No.	Action
1.	Open the Intervention Criteria window. This is done by selecting “Mission Processing | Intervention”.
2.	Select and delete any intervention rules which you do not want present.
3.	To make a new intervention rule, select "New...".
4.	On the Intervention Rule window select those conditions which will cause the mission to stop for operator review.
5.	Click OK on the Intervention Rules window to save the new rule.

6.	When done, click OK on the Intervention Criteria window to save changes and apply the new Intervention Setup.

B. Mission Toolbar.

An intervention point is produced when a mission comes into the system, gets processed and checks the Intervention Criteria to see if it should be stopped for operator review. If it is to be stopped, it presents the operator with an Intervention Point.

Intervention Points show up in the Mission Toolbar window. This window is used as a heads up display to provide access to seven categories of necessary operator action requests: Coordination Requests (both from and to your OPFAC), Intervention Points, Denied Missions and Missions which require More Information (TOT and Smoke). As a request for operator action comes in, the appropriate counter number will increase. The operator can click on the icon that represents that category and then view and action the request.

IMPORTANT!!

All workstations processing fire missions or listed as Establishing or Responsible Unit ID on an FSCM should keep the Mission Toolbar open and visible at all times.

As missions and coordination requests will be put here for the operator and will not be shot until they are actioned, it is important to action requests in this window as they come in.

To Open and Use the Mission Toolbar.

No.	Action
1.	Select the box labeled "TOOLS" on the Current menu bar.
2.	The Mission Toolbar will open. The seven icons (pictures) that appear to the left and directly below the Current situation Menu Bar indicate data that directly relates to mission processing. To the right side of each is a counter that tells how many requests are waiting for operator action.
3.	To action a request, select the icon which represents the request.

No.	Action
4.	If more than one request is pending, a list of requests will be given to you. Select one and action it.

C. Intervention Points.

When actioning the Intervention Point window, you will be provided with the target number, mission value, mission precedence and a list of filter guidances and whether they passed or not. Also listed on this window are all attack assets which are capable and available to shoot the mission with the munitions required.

To Open and Use the Intervention window.

No.	Action
1.	Open the Mission Toolbar by clicking on the box labeled "TOOLS".
2.	If the IP symbol's counter indicates one or more interventions present, click the IP symbol.
3.	If more than one intervention was present, a list of interventions will be presented. Select one and click OK. The Intervention window will open.
4.	Note the Mission Value, Mission Precedence and Target Type
5.	Note the results of the filter checks (duplication, TSS, etc.)

No.	Action
6.	Look at the Recommendation. It may recommend denying the mission or firing the target. If it recommends firing the mission, the first option of the selected FS system will be the one chosen. Options with the same number indicate massed fire. For example, the number 1 is listed next to units A, B and C on separate lines. This indicates that AFATDS recommends massing units A, B and C on the target. GREEN and YELLOW gumballs indicate capable options, although YELLOW indicates that coordination is required. A RED gumball indicates that attack options exist but no capable options exist for the system and a BLACK gumball indicates that no attack units exist for that FS system (that is, no options were even analyzed).
7.	To comply with the recommendation, select the OK button. The Intervention window will close. Go to step 2. (It there was a "Y" in the Coordination (Crd) field, and the recommendation was to send an FR/OTF/FO, a coordination request will be sent.)
8.	To select a non-recommended, capable attack option, select the desired Option and select "Send". The Intervention window will close. Go to step 2.
9.	To send an Order to Fire or Fire Order to any unit, select "Options | OTF/FO". Fill out the OTF/FO Send To window and select Send. The Intervention window will close. Go to step 2.
10.	To cause an Unsupportable to be sent to your supported HQ, select Unsupportable. The Intervention window will close. Go to step 2.
11.	To Deny the mission, select Deny. The Intervention window will close. Go to step 2.
12.	To view all attack options, both capable and non-capable, select "Options | View Attack Options". The Attack Options window will open. All capable and non-capable options are shown on this window. Options with the same number indicate massed fire.
13.	To select an option in the Attack Options window, select the number of the option desired and select Send. The Attack Option window will close.

No.	Action
14.	To close the Attack Option window and return to the Intervention window, select Cancel.
15.	To view detailed information about EFOGM and ATACMS BAT missions, select "Options	view missile info".
16.	To override incapable ("NO GO") missile options, select "NO GO" and change to "Override". This will allow the mission to be sent to the unit that was found incapable (do this only if you have knowledge that the mission should be fired).

D. Coordination and Coordination Requesting.

Coordination is required when the effects area around a target violates one or more FSCMs or ZORs (see section 5 on Geometries). When coordination is required before shooting a fire mission, a coordination request must be approved by the establishing unit of the FSCM or the responsible unit of the ZOR. When Intervention is ON, this will appear as a yellow gumball next to a system that requires coordination.

To View the Coordination Needed for an Option.

No.	Action
1.	In the Intervention window, select the System and the Attack Option which requires coordination.
2.	Select “View Coordination” OR action the Intervention and go to step (8).
3.	The Request Coordination window will open showing the unit(s) with whom coordination is required with.
4.	Select a unit ID on the left of the window. The violated FSCMs will appear on the right-hand list.
5.	TO REQUEST COORDINATION -- Select SEND. Note: You should not have to do this – coordination requests are automatically sent when an attack option is selected (see item 9 below).
6.	TO OVERRIDE A COORDINATION -- Select the option menu for the unit and select OVERRIDE.

No.	Action
7.	When the unit approves or denies the coordination request, this window will show DENIED or GRANTED next to the unit ID. This window can be accessed at any time BEFORE the Intervention is actioned.
8.	Once the Intervention is actioned, the mission will await the coordination response. This response will show up under the RCVD Coordination icon in the Mission Toolbar for viewing. The mission will be dealt with accordingly.
9.	If the Intervention is actioned ("OK"ed) even though coordination approval was not requested, a Coordination Request will be sent and will appear under the Coordination icon on the Mission Toolbar. Click the Handshaking icon to view the Coordination request. This is the same icon a Request for Coordination will appear under at the Approving Unit.

E. <u>Attack Option Review</u>.

Sometimes, the desired option (or any option) is not listed on the Intervention window. To view ALL options, capable and non-capable, the Attack Options tab can be looked at.

At the top of the Attack Options tab, whether the FS System being viewed met the Mission Cutoff value in the Mission Prioritization Guidance will be shown (this is applicable for FSEs only). When selecting a fire unit, some statistics are shown which relate the value of this mission to the value of other missions currently active. This will give you the relative importance of this target compared to other missions in progress at the selected fire unit.

On this tab, each option will be listed with a number to the left listing the option's rank order. Options which show the same rank order are massed options. Each option has associated with it a munition choice. By selecting an option, the munition choice for the option as well as the range to target for the attack asset, the angle T and the response time for the asset are displayed. At FA CPs, the response time shown for a selected fire unit is based on how long the fire unit will take to get to this mission considering previously assigned targets (number of volleys and mission value).

Next to each option is a series of icons which represent certain checks made for that unit option. Under the icon will be listed a Y or N which tells whether this check was passed or failed; blank indicates that the option was not checked or is not applicable.

Asset Within Range?

Yes is capable. If **N**o then the target is out of the Range Fan for the attacking asset. The Range Fan is determined by the Max Range entered on the unit's Detailed Information window and the unit's traverse limits, as well as the Max Range of the munition associated with the option. Select the unit option and view the Range [to target] and the FFE Shell #1 and #2 in the bottom of the window. (Propellant charge is not considered; the munition's max. range is the max. for any propellant).

Near Mask Violation

No is capable. If Yes then a mask violation has been determined.

Downrange Mask Violation

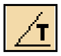
No is capable. If Yes then a terrain feature, such as a hill exists between the weapon system and the target location and the munition would be expected to impact the terrain feature prior to reaching the target.

Attack Within Response Time?

Yes is capable. If **N**o then the attack asset cannot attack the target before the Operational Until time of the target. A unit's capability is determined by adding the unit's Response Time to the Current DTG and then comparing this to the Operational Until Time of the target. At FSEs and FUs, a unit's Response Time is found on its Detailed Information window. At CPs, however, a unit's response time is determined by adding the length of time (based on the sustained rate of fire) required to attack all assigned targets which have higher mission value and precedence. The Operational Until Time of a target is the Target Decay Time for that target type (in the Target Decay Guidance) added to the DTG the target was originated or received. For more information, select the unit option and view the unit's Response Time in the bottom of the window. The target's Operational Until time is on the Intervention window.

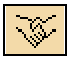
Ammunition Available?

Yes is capable. If **N**o then (1) the attack asset does not have enough of the corresponding Shell or Fuze (Propellants are not considered), (2) the unit has been restricted from firing the corresponding Shell or Fuze, (3) the option is a mass option and the number of units for the mass in insufficient. Select the unit option and view the FFE Shell and Fuze information in the bottom if the window. For ammo quantity problems, check the ammunition for the unit in the Munition or Fuze window from that unit's Basic Unit Information window. For ammo restriction problems, check to see if the unit is restricted against firing certain shells or fuzes in the FA or Mortar Restrictions Table or if the unit has a limit on the maximum rounds per mission. For massing problems, check to see if all units in the massed option show **N**o for Ammo. If so, then this generally indicates that there were an insufficient number of units to mass on the target; two-thirds of the weapons are required (e.g. 16 of the 24 tubes for a Bn mass).



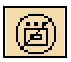
Within Angle-T for Copperhead?

Yes is capable. If **N**o then the Angle-T (angle between OT and GT lines) is greater than 0800 mils. Select the unit option and view the Angle-T in the bottom of the window. This will be blank except for Copperhead options.



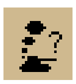
Coordination Required?

No is capable. If **Y**es then the mission requires coordination. The required coordination can be viewed by going to the Intervention window and selecting "View Coordination" from the "Options" menu. From there, coordination can be requested or overridden as appropriate.



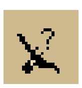
Unrestricted Unit?

Yes is capable. If **N**o then the attack asset has been restricted from firing that target type.



Achievable Effects?

Yes is capable. If **N**o then the attack asset cannot achieve the effects as requested in the FR/OTF or as set in the TMM for that target type. Some target types are considered "effects" target types; a volleys quantity is computed using the effects level set in the TMM when a volleys quantity is not entered in the CFF or on the Attack Methods Table. Given the effects percentage, the munition and the target type, very high volleys requirements might be necessary causing the option to fail.



System Appropriate For Mission Type?

Yes is capable. If **N**o then the selected FS System cannot attack the target because of an incompatible Mission Type. MLRS and Air cannot perform Adjust, Immediate Suppression, nor Immediate Smoke missions. The Mission Type is listed on the Target Information window off of the Intervention window.

To View and Use the Attack Option Review window.

No.	Action
1.	On the Intervention window, select “Options | View Attack Options”.
2.	The Attack Options window will open.
3.	Select the appropriate FS System to view.
4.	Note whether the Mission Cutoff was met for this system. (FSEs only).
5.	View the attack options. By selecting one, you can view the munitions required for the option as well as the range to target, angle T and response time.
6.	Note the icons representing the pass or failure of certain checks.
7.	TO OVERRIDE AND SELECT A LISTED OPTION -- Select the option and Select Send.
8.	TO CREATE A CUSTOM ORDER TO FIRE or FIRE ORDER -- Select the OTF/FO button and fill out the window which appears.
9.	TO CANCEL AND NOT ACTION THE OPTION REVIEW -- Select Cancel.

F. Missile Information Review.

When AFATDS has determined a recommendation to use EFOGM or ATACMS BAT, additional information is available by selecting the "Options | View Missile Info" menu item from the intervention point window. The Missile Info window will display the results of AFATDS processing for the missile option. The "parent" (original) target number is displayed on the top of the window along with some target information and a "GO" / "NO-GO" assessment for the mission. If the target was segmented, the "children" targets will be listed in the bottom of the form with a "GO" / "NO-GO" rating for each target. The "NO-GO" reason (if any) will be displayed.

The form also lists the fire units that are to be assigned the mission (one fire unit per child target). If the target was not segmented, the original target number will appear on the lower half of the window as well as on the top. You may override "NO-GO" options from this window.

Mission Processing
Mission Value

A. Concept.

During target processing, AFATDS will assign a mission value to each received mission. Mission value is a number between 0 and 100 and serves two purposes. First, the mission value is used to rank order missions waiting to be attacked and second, the mission value is used to determine which fire support systems may be considered for use in attacking the target.

B. Mission Prioritization Guidance.

This guidance is used to determine the mission value for targets as they are processed. Prioritization guidance consists of the following basic parameters:

- Priority of Fires ranking (ranked list of units considered for priority of fires-most important to least important)

- TAI Ranking (ranked list of TAIs-most important to least important)

- Target Type values (as defined by the HPT value, or, for non-HPTs the target category value)

- An indication of whether a target that is “On-Call” should influence its mission value

The operator is provided the capability to assign weighted values to each of the parameters (above) considered in target prioritization. For example, if during phase 1 the priority of fires is the most important aspect of target prioritization; the operator may assign the highest weight (relative value) to the priority of fires parameter.

Mission prioritization guidance allows the operator to assign the relative importance of each parameter by using either a weighting (0-100) or ranking (1-4) approach for the 4 parameters depending on the outcome desired.

By ranking the parameters, all missions will receive a value such that one may predict whether one mission will have a higher or lower value than another mission . When a mission is prioritized under a ranking scheme, the value of a mission that meets the "number one" parameter (e.g., target's observer supports the unit having priority of fires) should be higher than the value of a mission that does not meet the "number one" parameter (e.g., is from an observer that supports the unit that does not have priority of fires).

By weighting the parameters, the end results (e.g. which of two targets will get the higher mission value) are less predictable then ranking. Weighting allows the "best" targets to attack to get higher values. For example, in a ranking scheme where priority of fires was ranked "1" and target type was ranked "2", a low value non-HPT target (e.g. "light wheeled vehicle") submitted by an observer in the unit that has the priority of fires would receive a higher value than any HPT target submitted by an observer in a unit that does not have priority of fires. By using the weighting scheme, you can cause AFATDS to consider all of a target's parameters when calculating the mission value so that the HPTs from the non-priority unit get mission values higher than low value targets from the priority of fires unit.

The operator may also specify mission value cutoffs (these specify the minimum value a mission must receive before AFATDS will consider using the associated FS system). This serves as a method for the FSCOORD to ensure that only the most important missions are allocated to a scarce resource (e.g., Air or Aviation).

C. Calculate Mission value - General information.

AFATDS uses target data in the received mission, the mission prioritization guidance, high value target (HVT) list, high payoff target (HPT) guidance in the TMM, and target area of interest (TAI) geometries to compute the mission value and determine if the mission passes or fails the mission cutoff check.

AFATDS computes the mission value considering the four separate parameters of Target Value, Priority of Fires Value, On-Call Value and TAI Value.

Once the mission value has been determined, the mission value is compared with the mission cutoff values for each FS system to determine if the mission passes or fails the mission value check (Note: this is done for all received fire requests). If the mission value is equal to or exceeds the mission cutoff value for one or more attack systems, then it passes the mission value check for that system. If the mission value is less than the cutoff value an attack system, then it fails the mission value check for that system.

Mission values are not derived by viewing separate missions and comparing them to each other. AFATDS assigns a mission value as the mission is processed. If a comparison is performed on mission values that have been prioritized, the mission values should vary as described below. If intervention is on, the operator may view the computed mission value, and mission value check results.

AFATDS computes the mission value (between 0 - 100) considering the following mission parameters:

- Target Type Value (based on the target value in the TMM or, for non HPTs, the HVT list)

- Associated TAI Value (based on the TAI, if any, that encloses the Target). If the target is in multiple TAIs, the TAI with the highest ranked value in the mission prioritization guidance is used.

- Associated Priority of Fires Value (based on the Observer ID, The observer's supported unit ID, or the unit that sent the mission to the local OPFAC). If more then one of these units are in the priority of fires guidance then the highest ranked POF unit is used in the calculation.

- On-Call Value (based on whether the mission was initiated off of the on-call target list)

D. Calculate Mission value –Example of weighted scheme.

If the mission prioritization guidance is based on a weighted scheme and the operator assigns a relative value from 0-100 to each of the mission parameters, AFATDS produces a mission value such that:

1. If the TAI enclosing the target, the associated Priority of Fires unit, and the On-Call indication for two missions were the same, the mission on the target with the lower Target value would have a mission value lower than (or at best, equal to) the mission on the target with the higher Target value. For example:

	Mission 1	Mission 2
Type	Tank, Heavy	Infantry
Assoc TAI	TAI 1	TAI 1
Originator	A/FIST 1-11 INF	A/FIST 1-11 INF
On-Call	Yes	Yes

In this example, if the Tank target had a higher value in the TMM guidance, mission 2 would receive a lower, or at best, an equal mission value relative to mission 1. Note that the mission on the infantry target would never receive a higher mission value than the mission on the tank target. The relative differences in the weighted parameters in the mission prioritization guidance and the value differences of the targets in the target guidance might not be enough to cause the mission value for mission 2 to be lower than mission 1 (e.g., if in the TMM the infantry target had a relative value 1% lower than the tank target).

2. If the TAI enclosing the target, the associated Priority of Fires unit, and the Target Type for two missions were the same, the mission with the target that was not On-Call would have a mission value lower than (or at best, equal to) the mission with the target that was On-Call . For example:

	Mission 3	Mission 4
Type	Infantry	Infantry
Assoc TAI	TAI 1	TAI 1
Originator	A/FIST 1-11 INF	A/FIST 1-11 INF
On-Call	No	Yes

In this example, since mission 3 was not on an On-Call target, it would receive a lower or, at best, an equal mission value relative to mission 4.

3. If the Target Type, the associated Priority of Fires unit, and the On-Call indication for two missions were the same, the mission on the target in the lower ranked TAI (or not in any TAI) would have a mission value lower than (or at best, equal to) the mission on the target in the higher ranked TAI. For example:

	Mission 5	Mission 6
Type	ADA, Heavy	ADA, Heavy
Assoc TAI	TAI 1	TAI 8
Originator	A/FIST 1-11 INF	A/FIST 1-11 INF
On-Call	Yes	Yes

TAI Ranking (in the mission prioritization guidance):
1 - TAI 44
2 - TAI 8
3 - TAI 2
4 - TAI 1

In this example, since mission 5 was on a target in TAI 1, it would receive a lower or, at best, an equal mission value relative to mission 6.

4. If the TAI enclosing the target, the Target Type, and the On-Call indication for two missions were the same, the mission associated with the lower ranked Priority of Fires unit, would have a mission value lower than (or at best, equal to) the mission with the higher ranked Priority of Fires unit. For example:

	Mission 7	Mission 8
Type	Vehicle, Recon	Vehicle, Recon
Assoc TAI	none	none
Originator	B/FIST 1-11 INF	A/FIST 1-11 INF
On-Call	No	No

Priority Of Fires Ranking (in the mission prioritization guidance):
1- A/1-11 INF
2- B/1-11 INF
3- C/1-11 INF

In this example, since mission 7 came from a unit associated with B/1-11 INF, it would receive a lower or, at best, an equal mission value relative to mission 6 (which came from a unit associated with A/1-11 INF) .

E. Calculate Mission value –Example of Ranked scheme.

If the mission prioritization guidance is based on a ranked scheme and the operator assigns a ranking from 1-4 to each of the mission parameters, AFATDS produces a mission value such that:

1. The value of a mission that meets the number one parameter is higher than the value for a mission that does not meet that parameter (in cases where two or more missions meet the same parameter, the number two parameter determines which target would have the higher mission value, then the number three parameter and finally the number four parameter). For example, the following current guidance is in effect:

TMM Guidance

Target Type	HPT value
Tank, Heavy	75
Missile, Heavy	87
ADA, Light	85
ADA, Position Area	70
Artillery, Heavy SP	90

HVT Guidance

Target Category	Category Value
C3	90
ADA	70
Fire Support	65
Engineer	50
RSTA	50
REC	70

Mission Prioritization Guidance

Priority Of Fires Ranking
1- A/1-11 INF
2- B/1-11 INF
3- C/1-11 INF

TAI Ranking
1 - TAI 44
2 - TAI 8
3 - TAI 2
4 - TAI 1

Parameter Values

Value	Rank
Target Type Value	2
TAI	3
Priority of Fires Unit	1
On-Call Indication	4

The following missions receive a mission value:

	Mission 10	Mission 11	Mission 12	Mission 13
Type	Tank, Heavy	Msl, Heavy	Tank, Heavy	Tank, Heavy
Assoc TAI	none	TAI 44	TAI 8	TAI 2
Originator	B/FIST 1-11	A/FIST 1-11	B/FIST 1-11	A/FIST 1-11
On-Call	No	No	Yes	No

2. AFATDS produces a mission value for each of the missions such that (if compared against each other): Mission 11 value > Mission 13 value > Mission 12 value > Mission 10 value. Reasons for this behavior are:

Mission 11 value > Mission 13: While both are from the highest ranked priority of fires sector, and priority of fires is the highest ranked parameter, mission 11 has a higher value target.

Mission 13 > Mission 12: Mission 13 comes from a higher priority of fires sector.

Mission 12 > Mission 10: The priority of fires and target types are the same so the 3rd ranked parameter (TAI) determines which mission would have higher value. In this case since mission 10 is not in a TAI and mission 12 is, mission 12 would be expected to receive the higher value.

NOTE!

Mission values are not derived from holding up missions and comparing them to each other. AFATDS assigns a mission value as the mission is processed. If one was to compare values on missions that have been prioritized, the mission values should vary as described above.

F. Setting Up and Checking the Mission Prioritization Guidance.

In order to decide how to set up the mission prioritization guidance, follow the steps below:

- Ensure you TMM is set up to identify and weight the HPTs
- Enter the desired rankings for the TAIs and Priority of Fires units
- Select a weight or rank scheme and enter the desired weight or rank for each parameter.
- "Ok" the guidance to save

If you want to check out the values that targets will be assigned, you may optionally use the following steps to get a good idea of how different targets will prioritize:

- Open your on-call target list (or, if you are working in a plan, open a target list you have created for that plan).

- First create a target using the Priority of Fires unit as the observer, place it in the highest ranked TAI (if any) and use a target type equal to the Highest vale HPT.

- Create other targets (a couple more will do) varying the target type, observer and location

- Select the "List" option on the target list and select "calculate Values". Each target will have a value calculated – the first target you entered (HPT, POF observer, in TAI) should have the highest value. The other targets will have an equal or lower value depending on how much difference the target parameters were.

- Review the individual values. To modify the guidance – click the "Mission Prioritization" button on the target list – this will open the guidance allowing you to change weights or ranks. "Ok" the Mission Prioritization guidance and then select "Calculate values" again. Keep doing this until you get the variance between values that is desired.

- Based on the above analysis you may also desire to change the Mission Cutoff values in the guidance as well.

G. <u>Mission Precedence.</u>

In addition to a mission value, each target gets a mission precedence. This can be assigned by the originator of the mission (e.g. an observer specifying "Immediate Suppression"). If it is not assigned by the originator, it will be taken from the "When" value in the TMM. The four (4) precedences which can be assigned are Planned, Immediate, As Acquired or Priority.

- Planned precedence may be assigned to ATIs that pass TSS. The target is then placed on the Planned Target List. The Planned precedence can be operator assigned from the IP (intervention), thereby placing the target on the Planned Target List and denying the mission.
- Priority missions are the highest priority. These are Priority, Copperhead and FPF missions only. They are not ordered by mission value, but are instead shot FIFO. They are shot before any other targets on command from the observer.
- Immediate missions are the second highest priority active target. Missions are ordered by the mission value and are processed before any As Acquired targets. Immediate missions can be Immediate Smoke, Immediate Suppression or just Immediate. This can be operator assigned at the IP (Intervention Point).
- Within the As Acquired category, missions are ordered by the mission value. These are processed if no Priority and Immediate

targets are waiting to be processed. This precedence can also be operator assigned at the IP (Intervention Point).

In summary: When AFATDS has a backlog of missions to execute, it will process and send out a priority mission before an immediate mission. As acquired missions are processed and transmitted after immediate missions.

Since AFATDS does not hold up missions to see if other, potentially more important, missions are received, this “queuing” action can usually be observed when AFATDS is under an extremely heavy mission load or at those AFATDS OPFACs that are managing weapon control systems (like the BCS or Mortar Ballistic Computer). When missions are waiting to be sent to these devices (because the device’s mission buffers are full), AFATDS uses the mission precedence and mission value to determine what mission should be sent next. Note that the mission’s NLT (or operational until time) may also influence the decision made by AFATDS when determining the next mission to send to the weapon control system.

Mission originators and AFATDS guidance creators should use Immediate precedence sparingly and only for the most critical missions because of the dramatic effect it has on mission execution.

H. Mission Cutoff Value.

As some fire support resources are more scarce than others, we may want to only shoot more important targets with our more scarce systems. The Mission Cutoff Value on the Mission Prioritization window will allow us to set the MINIMUM mission value in order to be shot by a given system. The systems which minimum values can be set for are FA, Mortar, NSFS, Aviation, Rocket/Missile, and Air. Table 10 shows an example of a Mission Cutoff Table.

Table 10. Mission Cutoff Values Restrict Valuable Systems from Attacking Low Priority Targets

System	Cutoff Value
FA Cannon	10
Mortar	0
NSFS	40
Air	70
Aviation	55

Table 10. Mission Cutoff Values Restrict Valuable Systems from Attacking Low Priority Targets	
System	Cutoff Value
Rocket/Missile	60

When the target is received and the target's mission value has been determined, the Mission Cutoff Value table is looked at to see which systems are allowed to shoot the target. For example, if a target had a mission value of 45, that target could be shot with FA or NSFS. Air, Mortars, Rocket/Missiles, and Aviation would not be considered because the value is below the MINIMUM mission cutoff value.

Obviously, if our OPFAC does not consider certain assets, such as Mortars at a BDE FSE, you can just leave a default value (e.g. "0") in the table.

When setting Mission Cutoff Values, consider your tactical situation. You may want to experiment with a Target List (Plan-Phase Target List or the On-Call List in Current) to see what kind of mission values you can expect. A "Mission Prioritization" button has been placed on each Target List to help you complete this task.

Mission Processing
Target Generation

A. Target Generation Overview.
Target Generation automates the target generation tasks performed by the Target Production Section of the Division Artillery Tactical Operations Section. The Generate Targets function consists of a series of processes that compare and combine targetable information in order to produce generated targets and update the suspect target list and target indicator file. Generate Targets takes suspect targets (target data that has failed TSS), and target indicators (such as shell reports) as inputs, and through several processes eliminates duplication, determines and refines suspect target locations, and produces generated targets. The Generate Targets Function can be turned on or off based on the targeting needs in a given tactical situation. The outputs of this function are generated targets and an updated suspect target list and target indicator file. Some key definitions related to Target Generation are:

- Target Indicator. Target indicators represent directional information that forms a ray (line) from a given point, in a given direction, to a derived maximum distance along which a possible enemy target may be located. Examples of target indicators include shelling, flash, and jam strobe reports. A target indicator will have a target type (e.g. "Artillery, Unknown", "EW Equipment").
- Target Data. Target data is grid producing information received at AFATDS via a fire request (e.g., a call for fire received from an observer or a fire mission initiated by an AFATDS operator), or intelligence information (e.g., ATI report received from an observer). Target data is also produced by AFATDS. For example, AFATDS uses intersecting target indicator rays to determine a grid location, thereby generating target data.
- Target. A target is target data that has passed target selection standards, and therefore, is worthy of attacking because it meets the commander's criteria for reliability, accuracy, and timeliness. Targets undergo further mission processing to determine if a fire mission is executed based on comparisons to additional targeting and attack guidance, the target's relative value to other targets, and if attack systems are capable of engaging the target.
- Suspect Target. A suspect target is target data that has failed target selection standards and may not be worthy of attacking because it does not meet the commander's criteria for reliability, accuracy or

timeliness. Suspect targets are further refined until they pass target selection standards, the operator initiates a fire mission on the suspect target, or the suspect target decays (based on target decay guidance) and is deleted from the suspect target list.

B. Target Indicator Processing.

1. Routing Target Indicators. If your OPFAC does not normally perform targeting functions for shell reports and the like, a routing function is available so that if your OPFAC receives a target indicator it will automatically be routed to a specific address. For example, a Bn FSE OPFAC may receive sporadic shelling reports from his observers. The Bn FSO may direct that these be forwarded to Divarty (or whoever is handling counterfire efforts) as soon as they are received. To do this select "Messages/Configure Message Setup" and highlight the "Target Indicator" message type and input the Divarty address (make sure Divarty is in your communications configuration).

2. Processing a received target indicator. AFATDS will always perform certain functions when a target indicator is initially received (whether it was received from an observer or created through operator input). When AFATDS receives target indicator data, some of the information necessary to process the indicator may not be present. AFATDS automatically determines the missing information based on reporting observer data and default data files as follows:

a. Assign Target Indicator Number. If the received target indicator does not have a target indicator number, one is assigned based on the next available target indicator number from the OPFAC target indicator number block. The Target indicator number must always begin with "II". If a target indicator is received with a number that does not begin with "II", the number will automatically be replaced with an "II" number. AFATDS maintains a target indicator numbering block which the operator cannot edit. This block goes from "II0000 to II9999".

IMPORTANT!!

When you enter a target indicator into AFATDS try to avoid entering a number (AFATDS will automatically number the indicator).

b. If not provided, a Target Indicator Decay DTG for the target indicator is computed by adding target decay guidance for the target type to the DTG of acquisition/report. The DTG of report will be defaulted to the current time if not provided.

c. If the received target indicator does not have a target type, one is assigned based on the following rules:

- If the weapon type is Artillery: use Artillery, Unknown.

- If weapon type is Mortar, the target type is based on the reported caliber, otherwise the target type is Mortar, Unknown. If the caliber of the mortar is reported, AFATDS will determine the target type using the following table:

Table 11. Mortar Caliber Target Type Mapping

Reported Caliber	Target Type
108-150 mm	Mortar, Heavy
61-107 mm	Mortar, Medium
<60 mm	Mortar, Light
not given	Mortar, Unknown

- If the weapon type is Rockets or Missiles: use Rocket/Missile, Unknown.

- If the weapon type is an Electronic Emitter (or any other electronic target), then the target type is Electronic Warfare Equipment.

d. The following table lists target categories and types and their similarity to other targets. This data is used to support target duplication checks.

Table 12. Similar Target Matrix

MATRIX NUMBER	TARGET TYPE	SIMILAR TO MATRIX NUMBER:
1	ADA, HEAVY	1, 3, 6, 2, 4, 33, 28
2	ADA, LIGHT	2, 3, 6, 1, 4, 33, 28
3	ADA, MEDIUM	3, 1, 6, 2, 4, 33, 28

Table 12. Similar Target Matrix		
MATRIX NUMBER	TARGET TYPE	SIMILAR TO MATRIX NUMBER:
4	ADA, MISSILE	4, 6, 1, 3, 2, 33, 34
5	ADA, POSITION AREA	5, 42, 1, 2, 3, 4, 6
6	ADA, UNKNOWN	6, 3, 1, 2, 4, 33, 28
7	AMMUNITION DUMP	7, 83, 84, 85, 86, 87
8	CP, BATTALION	8, 11, 12, 10, 13, 9
9	CP, DIVISION	9, 11, 8, 10, 13, 12
10	CP, FORWARD	10, 8, 12, 11, 9, 13
11	CP, REGIMENT	11, 9, 8, 19, 13, 12
12	CP, SMALL	12, 10, 8, 13, 9
13	CP, UNKNOWN	13, 8, 10, 11, 12, 9
14	GUIDANCE EQUIPMENT	14, 15, 88, 89, 94
15	NAVIGATIONAL AIDS	15, 14, 88, 89, 94
16	BRIDGE, FLOATING PONTOON FOOTBRIDGE	16, 17, 18, 45, 61, 60, 62, 63
17	BRIDGE, FLOATING PONTOON VEHICLE	17, 16, 18, 45, 61, 60, 62, 63
18	BRIDGE, FOOTBRIDGE, RAFT	18, 16, 17, 45, 61, 60, 62, 63
19	BUILDING, CONCRETE	19, 20, 21, 22, 23, 24
20	BUILDING, UNKNOWN	20, 19, 21, 22, 23, 24
21	BUILDING, MASONRY	21, 19, 20, 22, 23, 24
22	BUILDING, SPECIAL PURPOSE	22, 19, 20, 21, 23, 24
23	BUILDING, METAL	23, 19, 20, 21, 22, 24
24	BUILDING, WOOD	24, 19, 20, 21, 22, 23
25	BUNKER	25, 26
26	PILLBOX	26, 25
27	ARTILLERY, HEAVY SELF-PROPELLED	27, 29, 28, 31, 30
28	ARTILLERY, LIGHT SELF-PROPELLED	28, 29, 30, 31, 27, 38, 35
29	ARTILLERY, MEDIUM SELF-PROPELLED	29, 27, 28, 31, 30
30	ARTILLERY, TOWED	30, 31, 28, 29, 27, 38, 35
31	ARTILLERY, UNKNOWN	31, 29, 30, 28 ,27
32	MISSILE, HEAVY	32, 34, 33, 4
33	MISSILE, LIGHT	33, 34, 40, 41, 32, 43, 4
34	MISSILE, MEDIUM	34, 32, 33, 4
35	MORTAR, HEAVY	35, 37, 38, 39, 36, 28, 30

Table 12. Similar Target Matrix

MATRIX NUMBER	TARGET TYPE	SIMILAR TO MATRIX NUMBER:
36	MORTAR, LIGHT	36, 37, 39, 35, 38, 28, 30
37	MORTAR, MEDIUM	37, 36, 35, 39, 38, 28, 30
38	MORTAR, VERY HEAVY	38, 35, 37, 39, 36, 28, 30
39	MORTAR, UNKNOWN	39, 35, 37, 38, 36, 28, 30
40	ROCKET-MISSILE, ANTI-PERSONNEL	40, 41, 33, 64, 43
41	ROCKET-MISSILE, ANTI-TANK	41, 40, 64, 33, 43
42	ROCKET-MISSILE, POSITION AREA	42, 5, 40, 41
43	ROCKET-MISSILE, UNKNOWN	43, 40, 41, 43
44	BOAT	44, 48, 47, 46, 52
45	FERRY BRIDGE	45, 16, 17, 18, 63
46	HELICOPTER, ATTACK	46, 47, 48, 52, 44
47	HELICOPTER, CARGO	47, 46, 48, 52, 44
48	HELICOPTER, OBSERVATION	48, 46, 47, 52, 44
49	VEHICLE, HEAVY WHEEL	49, 50, 51, 95
50	VEHICLE, LIGHT WHEEL	50, 49, 51, 95
51	VEHICLE, UTILITY	51, 49, 50, 95
52	AIRCRAFT	52, 46, 47, 48, 44
53	DEFILE	53, 59, 54, 57, 58, 55, 56
54	HILL	54, 59, 53, 57, 58, 55, 56
55	LANDING STRIP	55, 58, 56, 57, 59, 53, 54
56	RAILROAD SEGMENT	56, 58, 55, 57, 59, 53, 54
57	ROAD JUNCTION	57, 55, 56, 58, 59, 53, 54
58	ROAD SEGMENT	58, 55, 56, 57, 59, 53, 54
59	TERRAIN FEATURE	59, 53, 54, 55, 56, 57, 58
60	BRIDGE, VEHICLE, CONCRETE	60, 62, 61, 17, 16, 18, 63
61	BRIDGE, VEHICLE, WOOD	61, 18, 60, 62, 17, 16, 63
62	BRIDGE, VEHICLE, STEEL	62, 60, 61, 17, 16, 18, 63
63	BRIDGE SITE	63, 16, 17, 18, 45, 60, 61
64	ANTI-TANK GUN	64, 77, 41, 40
65	ARMORED PERSONNEL CARRIER	65, 66, 79, 80, 78
66	ARMORED VEHICLE	66, 65, 79, 80, 78

Table 12. Similar Target Matrix		
MATRIX NUMBER	TARGET TYPE	SIMILAR TO MATRIX NUMBER:
67	ASSEMBLY AREA, MECHANIZED TROOPS	67, 70, 69, 71, 68
68	ASSEMBLY AREA, TROOPS	68, 70, 67, 69, 71
69	ASSEMBLY AREA, TROOPS AND ARMOR	69, 67, 70, 68, 71
70	ASSEMBLY AREA, TROOPS AND VEHICLES	70, 67, 69, 68, 71
71	ASSEMBLY AREA, UNKNOWN	71, 68, 70, 67, 69
72	INFANTRY	72, 76, 81, 75, 74, 82, 73
73	MACHINE GUN, HEAVY	73, 82, 74, 72, 76, 81
74	MACHINE GUN, LIGHT	74, 82, 73, 72, 76, 81
75	OBSERVATION POST	75, 12, 76, 72, 81
76	PATROL	76, 72, 81, 75, 74, 82, 73
77	RECOILLESS RIFLE	77, 64, 40, 41
78	TANK, HEAVY	78, 80, 79, 66, 65
79	TANK, LIGHT	79, 80, 78, 66, 65
80	TANK, MEDIUM	80, 78, 79, 66, 65
81	WORK PARTY	81, 76, 72, 75, 74, 82, 73
82	WEAPON, CREWSERVED	82, 73, 74, 72, 76, 81
83	CLASS I SUPPLY DUMP	83, 84, 7, 86, 87, 85
84	CLASS II SUPPLY DUMP	84, 83, 7, 86, 87, 85
85	SUPPLY DUMP, UNKNOWN	85, 83, 84, 7, 86, 87
86	CHEMICAL PRODUCTS COMPLEX	86, 87, 83, 84 ,7, 85
87	PETROLEUM PRODUCTS COMPLEX	87, 86, 83, 84, 7, 85
88	CHEMICAL PRODUCTS COMPLEX	Not similar to any other matrix number
89	ELECTRONIC WARFARE EQUIPMENT	89, 88, 94, 14, 15, 93, 91, 92, 90
90	COUNTER-BATTERY RADAR	90, 91, 92, 93, 94, 89, 88
91	COUNTER-MORTAR RADAR	91, 90, 92, 93, 94, 89, 88
92	DIRECTION FINDING RADAR	92, 91, 90, 93, 94, 89, 88
93	GROUND SURVEILLANCE RADAR	93, 92, 91, 90, 94, 89, 88
94	SEARCH LIGHT	94, 88, 89, 14, 15, 93, 92, 91, 90

Table 12. Similar Target Matrix		
MATRIX NUMBER	TARGET TYPE	SIMILAR TO MATRIX NUMBER:
95	RECONNAISSANCE VEHICLE	95, 49, 50, 51

e. If the target indicator does not include the sensor directional error (mils) then it is determined based on the default value for the reporting sensor or unit type using the following table:

Table 13. Sensor Characteristics

Sensor Type	Laser On Hand	Target Location Error (TLE)	Sensor Directional Error (mils)
FO	yes	80	10
FO	No	400	10
FIST	yes	80	5
FIST	No	400	5
COLT	yes	80	5
COLT	No	400	5
Observer not FA	yes	80	5
Observer not FA	No	400	5
Air Observer	yes	270	5
Air Observer	No	400	5
Naval Observer	yes	80	5
Naval Observer	No	400	5
Mortar Observer	yes	80	5
Mortar Observer	No	400	5
ANGLICO	yes	80	5
ANGLICO	No	400	5
AFAC	yes	270	5

Table 13. Sensor Characteristics			
Sensor Type	Laser On Hand	Target Location Error (TLE)	Sensor Directional Error (mils)
AFAC	No	400	5
FCT	yes	270	5
FCT	No	400	5
Radar AN/TPQ-36	N/A	100 or 1.0% of range	1
Radar AN/TPQ-37	N/A	90 or 0.9% of range	1
Radar JSTARS	N/A	400	1
All Others	yes	400	5
All Others	No	400	5

f. If the sensor location at time of report is not provided, then that sensor unit's most current location is used to determine this value, otherwise, if no location for the reporting unit is available then the target indicator report is discarded.

g. The direction and distance of the target indicator ray is determined by:

- Direction of ray originates from the sensor/shell impact location.

- Length of ray is based on the following:

  1). Use length provided, if given.

  2). If a flash to bang is provided, use Distance = 350 X Time (sec). Result is length of ray in meters.

  3). If length or flash to bang time is not provided, the ray length is based on the target type and the following table:

Table 14. Default Target Indicator Lengths	
Target Type	Ray Length (meters)
Mortar, Very Heavy	9700
Mortar, Heavy	7200
Mortar, Medium	7200
Mortar, Light	4200
Mortar, Unknown	7200
Artillery, Heavy, SP	37500
Artillery, Medium, SP	24700
Artillery, Light, SP	15300
Artillery, Towed	24700
Artillery, Unknown	24700
Rocket/Missile, Anti-Personnel	30000
Rocket/Missile, Anti-Tank	30000
Rocket/Missile, Position Area	30000
Rocket/Missile, Unknown	30000
Missile, Heavy	300000
Missile, Medium	100000
Missile, Light	100000
Electronic Warfare Equipment	30000

3. Display.

- Target indicators are displayed as “fans” based on the sensor directional error. The following figure shows a target indicator with a 10,000 meter length - oriented on a 1100 mil direction with a sensor directional error of 10 mils:

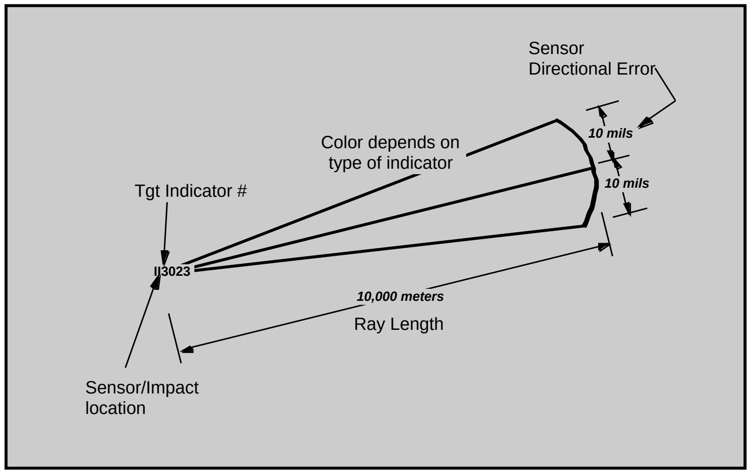


Figure 39. Target Indicator Display

- The color of the target indicator is determined based on the following table:

Table 15. Default Target Indicator Color

Target Type	Ray Color
Mortar, Very Heavy	Yellow
Mortar, Heavy	Yellow
Mortar, Medium	Yellow
Mortar, Light	Yellow
Mortar, Unknown	Yellow
Artillery, Heavy, SP	Red
Artillery, Medium, SP	Green
Artillery, Light, SP	Blue
Artillery, Towed	Green
Artillery, Unknown	Black
Rocket/Missile, Anti-Personnel	Orange
Rocket/Missile, Anti-Tank	Orange
Rocket/Missile, Position Area	Orange

Table 15. Default Target Indicator Color	
Target Type	Ray Color
Rocket/Missile, Unknown	Orange
Missile, Heavy	Orange
Missile, Medium	Orange
Missile, Light	Orange
Electronic Warfare Equipment	Black

4. Target Indicator Processing. Based on the tactical situation, the operator may or may not want the system to run the Target Indicator function. AFATDS allows the operator to turn the processing of target indicators on or off. When the target indicator processing is off, AFATDS will simply add the target indicator to the target indicator list with no additional processing or comparisons. When Target Indicator Processing is "on", AFATDS will perform the following checks (in order):

   a. Compare the target indicator against the current (but non-active) target files (i.e. targets on the "On-call", "Suspect", "Planned" and "Inactive" target lists). If the indicator ray covers a similar target, the operator with the mission processing duty is notified of the "Target-Target Indicator Match" via an alert and provided information on the target indicator and all matched targets. The operator may take various actions from this alert:

      - Selectively initiate fire mission(s) against the target(s) indicated as a match. This will open the initiate fire mission screen already filled out for the selected target.

      - Add selected matched target(s) to an existing Fire Plan. This will place the targets on the selected fire plan.

      - Display the target indicator fan-target comparison. This graphically displays the indicator fan and the associated matched target(s) on the map.

      - Selectively update matched target(s) with a new "last updated" value based on the target indicator DTG of acquisition/report.

- Delete The target indicator. This will discard the received target indicator data and will not add it to the target indicator list.

- Continue Processing the Target Indicator. This will add the target indicator to the target indicator list for possible combination with existing target indicators.

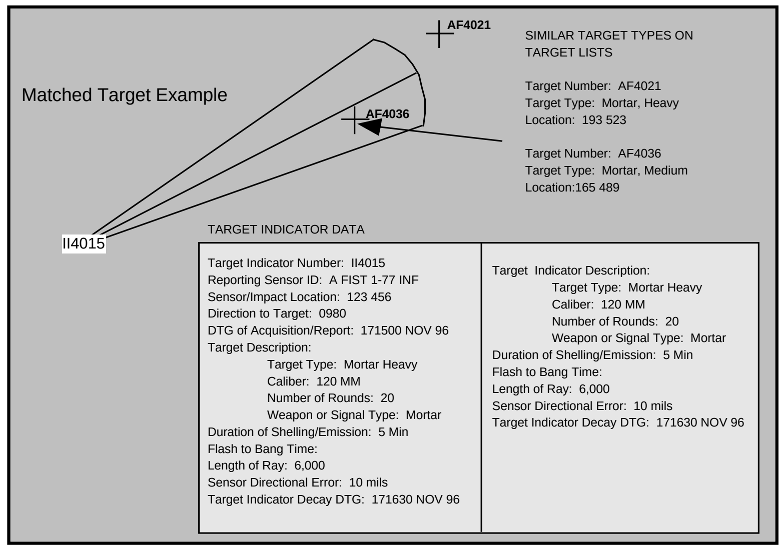


Figure 40. Target Indicator - Target Comparison

b. Compare the target indicator with other target indicators already on file. If the target indicator did not match a target or the operator selected “Process TI” from the target match window (discussed above), AFATDS will add the new target indicator to the target indicator list and determine if it can be combined with existing target indicators. The following rules are used in this comparison:

- The new target indicator is compared against existing target indicators in the target indicator file that have a similar target type. Only Target Indicators that have not passed their decay DTG are considered.

- When target indicator rays of three or more of the compared target indicators intersect to form a point or common area, and all points are located within 400 meters of each other AFATDS will automatically combine the rays - generate a new target - number the target - and pass the target to the TSS check for further processing. The combined TIs will be deleted from the TI list.

- If no match is found, the new target indicator is added to the target indicator file.

The operator may decide to have the target indicator list purged of target indicators when their “decay time” DTG is passed. To do this simply select “automatically purge” option on the target indicator list window.

A summary of the possible results of target indicator processing is provided in Figure 41.

5. Suspect Target Processing.

Remember that suspect targets represent target information that has not passed TSS. This section will deal with how AFATDS handles suspect targets after the TSS failure.

The operator may turn Suspect Target Processing “on” or “off”. When it is turned off, all suspect targets are simply added to the suspect target list with no further processing. When it is turned on, AFATDS will evaluate each received suspect target against other suspect targets in an effort to combine the new suspect target with an existing suspect target to generate a target with a better TLE and/or DTG sensed (remember that these are the key factors in the TSS check). The following considerations are applied by AFATDS when determining which targets to combine as well as the target data for the ”new” (combined) target:

- Only suspect targets that have not surpassed their decay DTG are considered for combination.

- Only targets with a similar type will be considered for combination. For example, an “Artillery, Unknown” target would not be combined with a “Building, Metal” target.

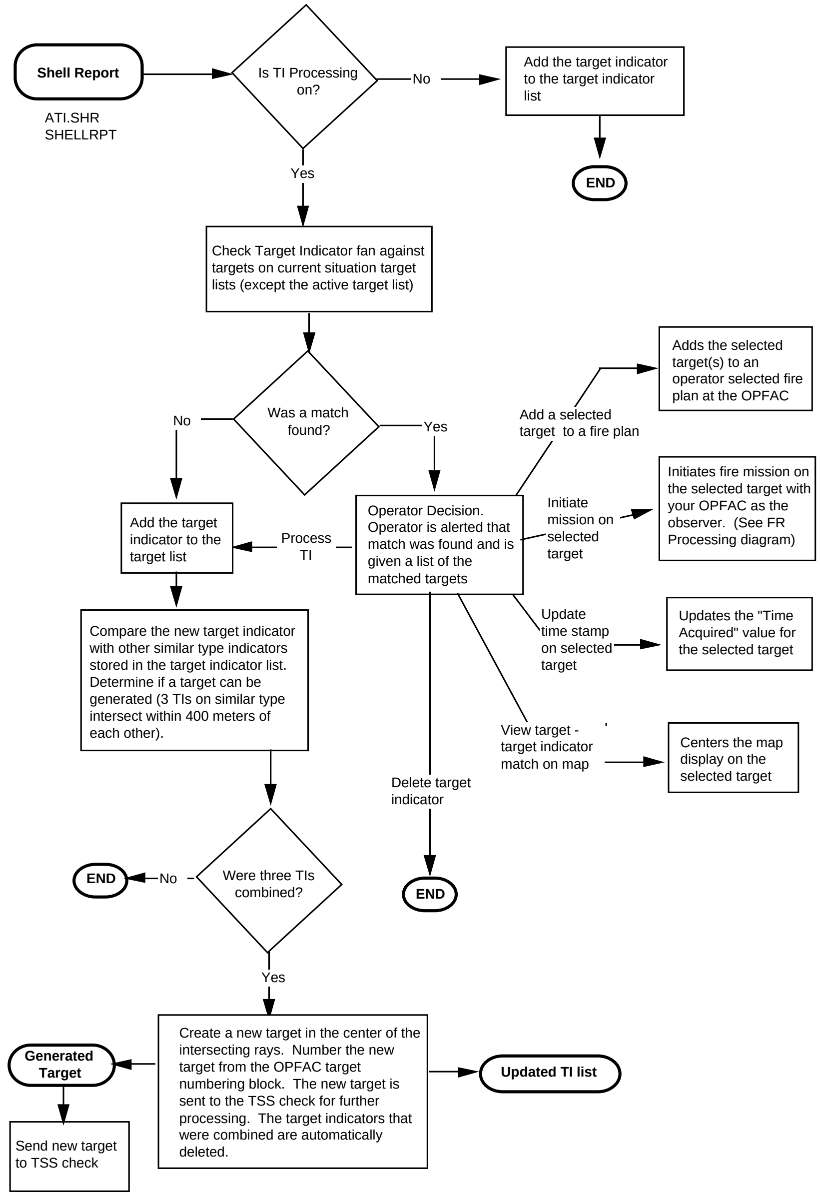
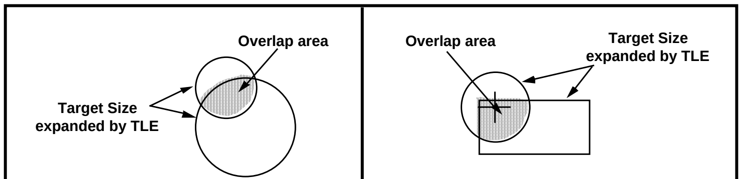


Figure 41. Target Indicator Processing

- The target size, increased by the TLE, for the new and extracted suspect targets is used to determine overlap.

- If an overlap exists between the new target and a single existing target and the overlap area meets or exceeds the operator established percentage of overlap required, then the two targets match. Basically, the Overlap % tells AFATDS how close two targets must be (considering the area and TLE of each target) in order to combine them. The following graphic shows some examples of this comparison.



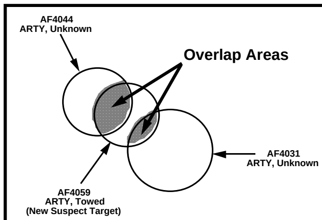
Comparing Circular targets

Comparing a point target with a rectangular target

- If multiple overlaps exists between the new suspect target and two or more existing suspect targets and each overlap area meets or exceeds the operator established percentage of overlap required, then the following rules apply:

  1). The suspect target with the greater degree of similarity to the new suspect target is combined with the new suspect target.

  2). If the degree of similarity is the same, the suspect target with the greater degree of overlap with the new suspect target is combined with the new suspect target



Example of new target overlapping two existing targets

- When two targets are combined, the new target is sent to TSS for further processing. Both of the “parent” targets (the two that were combined) are removed from the suspect target list.

6. <u>Managing Suspect target processing</u>. The operator may specify the “Overlap %” to be used by AFATDS when considering targets for

combination. A larger percentage (like 75%) will result in fewer, but more accurate, combinations than a smaller percentage (like 25%). As with the target indicator list, the operator may decide to have the suspect target list purged of targets when their "decay time" DTG is passed. To do this simply select "automatically purge" option on the suspect target list window. Finally, the operator may see the targets on the suspect target list that were generated by AFATDS (these will be the targets that have a "yes" in the "Combined?" column of the list). There is an option to "uncombine" a combined target if desired.

IMPORTANT!!

In order to update target data in AFATDS from IFSAS (or any other device), ensure the ATI message includes the same target number, and type as the existing target. Otherwise AFATDS will reject the update.

7. Package 11 ATI message (K02.09 Target Data Message) processing.

An ATI message received from a Package 11 device could be treated as a fire request, Intelligence data, MFR, On-Call Tgt, or Planned Tgt depending upon the information contained in the message. The table below summarizes the various dispositions possible for an ATI received by AFATDS.

Mission Fired Indicator Set?	Target Number Provided and Message Action is "Change" or "Delete"	Message Designator is "Shell Report"	Message Action is not Specified and Target Data (Number, Type, and Location is Provided	Message is ATI "Coordinate" or "ATI Azimuth" and Message Action is "Add"	Disposition
Y	N/A	N/A	N/A	N/A	MFR

Mission Fired Indicator Set?	Target Number Provided and Message Action is "Change " or "Delete"	Message Designator is "Shell Report"	Message Action is not Specified and Target Data (Number, Type, and Location is Provided	Message is ATI "Coordinate " or "ATI Azimuth" and Message Action is "Add"	Disposition
N	Y	N/A	N/A	N/A	PLANNED TARGET LIST (Update)
N	N	Y	N/A	N/A	TARGET INDICATOR
N	N	N	Y	N/A	TARGET INFO QUERY RESPONSE
N	N	N	N	Y	ATI SENT TO TSS

* Note: If the message does not fit into the above rules, it will be displayed upon receipt to the AFATDS operator.

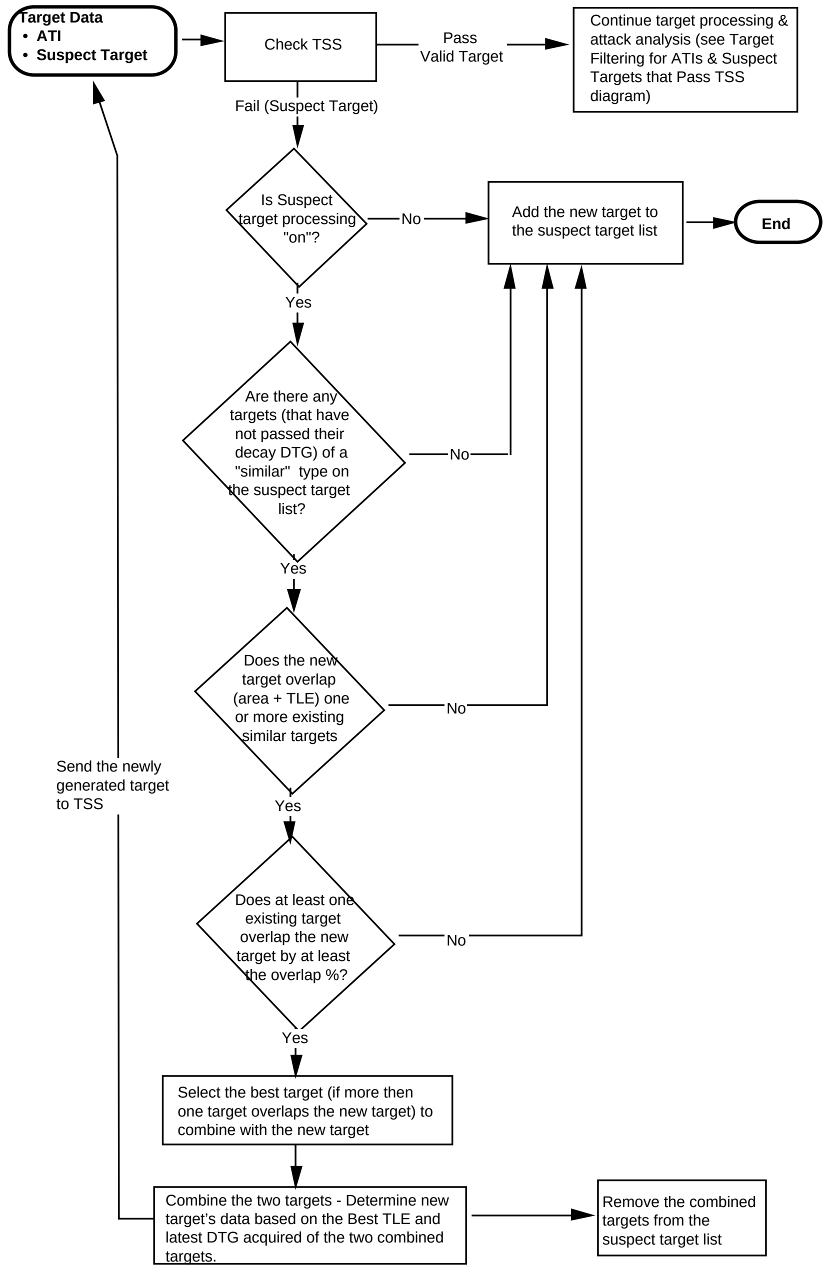


Figure 42. Suspect Target Processing

Mission Processing Troubleshooting

Symptom	Potential Problem
Target shows up on map, but Fire Mission does not get stopped at the intervention.	1) Intervention rules are not set to stop the mission. Edit your intervention rules so that they are setup as you intend them.
	2) Your are in a "Check Fire All" status. The right of the Mission Toolbar will show this status.
	3) Software Error. Restart machine and retry a similar fire mission.
No attack options are considered in the Intervention window. Gumball is black for a system.	1) No assets have your unit as their supported or command unit ID. Make sure any unit supporting or commanded by your unit has the appropriate supported or command HQ set. Also ensure mission assignments are set correctly (i.e. DS, R, etc.).
	2) No entry has been made in the "FS Attack Parameters" window and you do not have directly supporting or subordinate fire units (FSEs only).
	3) You are running unit level attack analysis but have not received an update (summary ammunition and basic unit data) from the CP(s) you are trying to analyze.

Symptom	Potential Problem
	4) No acceptable munitions could be determined for your available fire units. For example, if there was no specified munition for the mission and no attack methods entered for mortar, and the target is "Heavy Tank", AFATDS will not think that mortars should attack this type of target. - Try specifying something in the Attack Methods Table.
	5) You are running FS System Attack Analysis but have not filled out the FS Attack Parameters guidance.
Certain attack options should be shown as capable in Intervention window or Review window but are not.	1) Unit is unavailable. Edit the unit and ensure it is READY (or AVAILABLE).
	2) Unit has wrong command and supported HQ set. Edit unit and ensure his command or supported HQ is either you or one of your subordinates.
	3) Unit has no weapons. A fire unit must have operational weapons in order to be considered for assignment of fire missions.
	4) Mission failed the mission cutoff check (See "View Attack Options" window).
	5) Unit does not have enough ammunition or lacks enough fuzes (cannon options only).
	6) Unit or munition is restricted in FS Restrictions or FS Tasks guidance.
	7) AFATDS is trying to mass the mission but the FA Restriction guidance is not correctly filled out. This guidance should list your OPFAC with the maximum volleys and maximum fire units per target. If you do not fill out the maximum fire units, AFATDS assumes "1" and all massing options will be marked incapable (with an "N" under the bullet column).

Symptom	Potential Problem
Mission fails TSS every time.	1) The observer which originated the mission has a TLE which exceeds the specified minimum TLE in the TSS. Check your observer unit's TLE as well as the TSS.
	2) The observer which originated the mission is not in your Current situation. This will fail the TLE portion of the TSS.
	3) TSS TLE set to low.
Units are considered but mission fails due to response time every time.	1) Clock may be out of sync with the unit which sent you the mission. One or both of you must resync your clocks.
	2) Response times are set too high. Check the Response times for Cannons, Rockets and Mortars as well as the Response time for Air and NSFS assets. These times are in minutes.
	3) There is a large mission backlog at fire units such that the new mission could not be fired before it decays (due to its Operational Until time).
Observer sends in mission but it does not arrive at the OPFAC to get processed.	1) Observer is not in your Current situation. All non-AFATDS units MUST be in the Current situation for you to be able to communicate with them.
	2) Messages are not being processed on receipt. Check the "Messages | Configure Message Setup" window. This allows messages to be processed, deferred or re-routed on receipt. Make sure the CFF's are being processed.
Mission is sent to BCS but never arrives there.	1) BCS is not in your Current situation. All non-AFATDS units MUST be in the Current situation for you to be able to communicate with them.
	2) BCS Communication. Communications to the BCS is not set up or the route is set to None.

Symptom	Potential Problem
At TF FSE, no Cannon assets are being considered.	1) The TF FSE has no organic Cannon assets -- only Mortars. In order to be able to consider the Cannon assets under BDE, the BDE must be entered for Cannon in the FS System Attack Parameters.

IMPORTANT!!

If you are running FS system attack analysis, and one of the units you have specified in the 'route to' field of the FS System Attack Parameters window returns a mission as 'unsupportable', and you reprocess the mission, AFATDS may once again recommend the unit that just returned the mission as unsupportable. It does not automatically disqualify the unit from further consideration when running FS system attack analysis. You must select another option in this case.

Technical Fire Direction
General

AFATDS computes firing data for the control of cannon units. These processes are referred to as technical fire direction (TFD). AFATDS retains the capability to interface with the Battery Computer System (BCS) system for units equipped with the FDS system. The following sections divide the TFD processes into those associated with non-Paladin and Paladin cannon units.

Technical Fire Direction
Cannon Units

A. Non-Paladin Cannon Units.

1. Unit Role. Prior to activation of the AFATDS software, the Role FU is established on the Unit Configuration window at the battery/platoon FDC.

2. Unit data. Non-Paladin cannon units possess basic, general and detailed unit data.

a. The basic unit, general and detailed unit information provides a more complete picture than but is equivalent to the BCS AFU;UPDATE. This window is constructed in the same manner as for any other unit. The following special considerations apply:

1). The unit symbol should be that of an FDC or Unit.

2). The location represents the average location of all weapons of the unit. During initial construction of the unit data, this is a required entry. The orienting station grid may be entered prior to occupation of position and the unit location will be updated when weapons locations have been determined.

3). Refer to the units section of this notebook for additional information concerning basic unit information.

b. General unit data, like basic data, is similar to that of any other unit stored in AFATDS. Of special concern are the Current Command Unit ID and Current Supported Unit ID. These determine the units that can task the fire unit with fire missions. The MET Unit ID, used in met message dissemination, is not sent when the unit's data is transmitted and must be entered by the fire unit's parent unit to establish MET message distribution.

c. Detailed unit information provides weapons system specific data. The weapons model employed by the fire unit is selected by the operator. This action in turn establishes default values for ranges, response time and azimuth of lay and traverse limits. When the detailed weapon data has been completed, the operator may select the Apply button. This action stores the fire unit and activates access to additional unit data by displaying the remainder of the file folder tree on the left side of the window.

d. The weapons folder provides entry and review of data for each gun in the fire unit. This data is stored. Each gun possesses the following data.

1). Last Update. The time of last update is computed and displayed by AFATDS. This is set each time unit data is changed and cannot be edited by the operator.

2). Weapon Number. Permanently assigned gun number stores data.

3). Bumper Number. Bumper number is the vehicle bumper number of the weapon.

4). Weapon Model defaults based on the selection from the detailed unit information.

5). Caliber. Caliber is automatically entered based on the weapon model.

6). FA Category is the type of weapon and displays Towed or Self Propelled.

7). Max Range (m). Initially shows a default value based on weapon system but can be edited.

8). Min Range (m). Initially shows a default value based on weapon system but can be edited.

9). Max QE (mils). Initially shows a default value based on weapon system but can be edited. This value allows AFATDS to account for limits of positioning such as unlevel terrain that causes the weapon to achieve a lesser max elevation than mechanically allowable on level ground.

10). Max Rate of Fire (RPM) is populated based on the entry in detailed unit data. A unique max rate of fire can be entered for each weapon, but it is not currently used in AFATDS processing.

11). Sus Rate of Fire (RPM) is populated based on the entry in detailed unit data. A unique max rate of fire can be entered for each weapon, but it is not currently used in AFATDS processing.

12). MCA check box, when selected, indicates the weapon possesses an M94 chronograph with MCA device that is digitally linked to the GDU communications network.

13). Copperhead Capable check box, when selected, indicates the weapon has Copperhead available. Only weapons with this selection will be considered during mission processing to fire Copperhead munitions.

14). Powder Temperature (F) (in degrees Fahrenheit) stores the measured propellant temperature of ready ammunition. This value is used in the technical computation of firing data to modify the muzzle velocity for the effect of temperature.

15). Bridge Classification is the weight a bridge must support to allow this gun to pass. This defaults based on the weapon model and cannot be edited by the operator.

16). Time Operational is the DTG the unit became operational. This is automatically entered but can be edited.

17). Location. Location displays the grid from the basic unit data until weapon locations are calculated in the Calculate Wpn Loc tab. After calculation, the actual weapon location is displayed. Weapon location cannot be edited on the weapon tab. It must be edited on the Calculate Weapon Location tab.

18). Prime Mover/Ammo Carrier. Allow storage of data for the prime mover of a towed weapon or the ammunition vehicle for a self-propelled gun.

19). Near Masks. All entered mask data is displayed. Up to eight sets of mask data can be stored. The Add button allows the mask data to be input. Each mask is composed of a right and left azimuth (not deflection), limit range (range-to-crest) and a vertical angle (site-to-crest). This data is used during fire mission processing to determine near crest violations, automating the application of XO’s min QE.

e. Calculate Weapons Locations folder. Selecting the Calculate Weapons Locations folder displays the location of each gun stored in the Weapons folder and the locations of up to two orienting stations. The purpose of this window is the input of lay data and calculation of each gun's location and the average location of all guns. When lay data is entered, the Calculate Location button is selected. Locations are computed and updated for weapons, the average location is applied to the basic unit information and the lay data is discarded. The following data fields are provided.

1). Orienting Station A Loc. This is the location of the orienting station. The orienting station is the surveyed point of known location in the firing battery position. The aiming circle is established over the OS and used to measure angles of deflection to lay the battery's weapons parallel to the azimuth of lay. This measured data is used by AFATDS to determine the location of guns.

2). Orienting Station B Loc. If a firing position is large or in terrain with limited lines of site, it may not be possible to see and lay all the weapons from a single OS. Orienting Station B Loc provides for a second orienting station. This is optional and is not required to compute the fire unit location.

3). Weapon Number is the sequential number permanently assigned to a weapon.

4). Bumper Number is automatically entered based on weapon number.

5). Group subdivides the unit into platoons identified as left, center and right (optional entry).

6). Location. This field allows entry of the gun location as a grid, provided this data is known. Normally this field will not be entered by the operator since the normal method of locating a weapon is by lay data. NOTE: If grid location is entered, do not enter lay data for the weapon. When the Compute button is selected on this form, the grid location fields are populated with new values based on the entries in the lay data.

7). Ref. Identifies the point from which the lay data was measured. Clicking the field displays a pulldown menu. The weapon can be located from OS A or B or reciprocally from another gun by selecting the laying gun's number selection.

8). AZ (mils) is the azimuth from the reference location to the gun. The lay deflection for gun must be converted to azimuth by first adding the azimuth of lay (and subtracting 6400 if necessary.)

9). Range (m) is the angular distance from the reference location to the gun to the nearest meter.

10). VA (mils) is the difference in height between the reference location and the gun in mils.

f. Munitions. The Munitions folder accesses the shell inventory of the unit. This inventory is presented in spreadsheet form with each shell model on a separate line. Selecting any line highlights that row. The edit button can then be clicked to enter the following data:

1). LOT DESIGNATOR, a single letter, indicates the lot assigned at the fire unit. This lot designator is used in fire commands in place of the manufacturer's 12 to 13 characters lot.

2). LOT is the manufacturer's lot designator. Only letters and numbers can be stored. Hyphens (-) and other special characters are not allowed.

3). Weight allows entry of the projectile weight in pounds or square weight. The weight will be converted and stored in pounds when the window closes.

4). On Hand allows entry of the quantity of ammunition. Propellants folder and Fuzes folder store the propellant and fuze data in the same manner as the munitions folder.

3. Master Unit List. The guns of a non-Paladin fire unit are not added to the master unit list by the operator. Guns 1-12 are automatically added to the MUL on start AFATDS activation.

4. Communications. Wire or radio communications with the gun display unit (GDU). This is the same GDU as has been used with BCS since its inception. As with all communications in AFATDS, firing battery communications are established by building the network.

a. Establish the GDU Net.

1). Click System. Configuration, Communications, Current to display the Current Network window.

2). Click Network, New to display the Net Channel Settings window. This is the same window format is used to establish non-IP networks.

a). Network Name. This is the text name assigned to the network.

b). Protocol. Click the field to display a list of AFATDS supported protocols. Click GDU from the list. This causes the majority of the fields to become inactive as well as the More button. This is because GDU communications do not require the range of adjustment necessary to tailor a more long range and complex radio communications protocol.

c). Media Device. The most common media for intra-battery communications is two wire. AFATDS provides the ability to use AN/PRC-68 or AN/PRC-126 radio (Local Radio) or a mix (TWO-WIRE-AND-RADIO).

d). Preamble. The preamble is the amount of time after keying the communications device and before the transmission of the first part of the message given in seconds. This setting is heavily dependent upon the communications medium. The default is 0.250 seconds which is adequate for wire and most radios.

e). Click OK to store the network data. The Current Networks window is displayed.

b. Destination Units. Unlike external communications networks, the GDU network does not require the guns to be added to the destination units for the GDU network. The GDUs are automatically identified when they enter the net by initializing the section chief's assembly of the GDU at the gun. The AFATDS GDU net is turned on by selecting Control, On from the Net Channels Settings window. This is another departure from external network setup in that the network can be enabled without the establishment of destination units.

B. <u>Paladin Cannon Units</u>.

1. Unit Role. Prior to activation of the AFATDS software, the unit role for the platoon FDC is set to FA CP. This is a departure from the method used for a non-Paladin fire unit. This is necessary because each howitzer in a Paladin unit is constructed as a separate fire unit

controlled by the FDC. This relationship is similar to a cannon battalion FDC controlling multiple fire units.

2. Unit data. Paladin units are setup somewhat differently from non-Paladin cannon units.

   a. Platoon FDC. The platoon FDC is established as an other type unit with a unit symbol of command post.

   b. Paladin guns. Each Paladin gun is established as a *separate unit.* The gun is constructed in the database as a cannon type unit with a unit symbol of unit and an echelon of section. A single gun is added to the Weapons folder of the unit. This weapon must be designated weapon Number 1.

NOTE!

AFATDS will compute a technical solution for a Paladin howitzer only if the weapon reports a status of DEGRADED. The weapon can be directed to assume a degraded status by transmitting a STAY command to the weapon. The command is composed by clicking on the unit symbol. After selecting the unit, right click to display a pop-up menu. Select COMMAND.

3. Command and Control. To support the command and control of Paladin howitzers, AFATDS provides the capability to send Deployment Commands to them directing them to move to a firing area, to move to an initialization point, to move to a resupply point, or to stay.

4. Paladin howitzer location. The Automated Fire Control System (AFCS) at the Paladin howitzer transmits location data to AFATDS. Because the AFCS stores a map mod, the location is always reported in reference to the map mod grid zone. If operations occur at the junction of grid zones and the AFCS map mod spans this junction, AFATDS automatically converts coordinates from the AFCS map mod grid zone to the coordinate system of the adjacent grid zone if the point lies in the adjacent grid zone. This conversion change the easting coordinate significantly. The northing changes as well. Though at first examination this conversion may look like an error, the conversion is required to accurately measure distance and direction between the weapon location and targets.

IMPORTANT!!

Inadvertently hitting the middle trackball button on a unit icon for a single weapon fire unit (i.e. a Paladin unit) can result in a slight movement of the unit location. For a single weapon fire unit, this results in changing the weapon location. If the Paladin is in a degraded mode, this will result in AFATDS calculating an inaccurate ballistic solutions for it. If after inadvertently moving an icon, the operator goes to the "Calculate Weapon" tab and selects Compute, the unit location will be set back to the original weapon location.

5. Master unit list. Each gun of the Paladin unit must be established in the AFATDS Master Unit List. The device type Package 11 Paladin must be selected.

6. Communications Setup for AFATDS and the Paladin howitzers. The AFATDS protocol used to communicate with Package 11 Paladin units is a variant of the TACFIRE protocol and is called AFCS. To communicate with a Package 11 Paladin, you must know the version of Package 11 software the Paladin howitzer is using. Below are instructions for interfacing with Package 11 Paladin Versions 11.0 and 11.1.

NOTE!

For an AFATDS OPFAC controlling Paladin guns with a backup controlling AFATDS OPFAC, the VMF Unit ID for the backup controlling OPFAC must be entered in a specified manner. If the VMF Unit ID number is not entered in this manner, the Paladin guns will not successfully receive initialization data for the backup controlling AFATDS OPFAC. The VMF Unit ID in the System/Administration/AFATDS Master Unit List/Edit Unit window for the backup controlling OPFAC must be entered as specified below at the controlling OPFAC.

VMF Unit ID: _1B316

a. _ represents a blank space
b. 1 represents a Platoon Number (must be numeric)
c. B represents a Battery Identifier
d. 3 represents a Battalion Identifier
e. 16 represents a Regiment Identifier

All characters must be together and not separated by a special character or symbol. Ensure these units are in the Current Situation when edits are completed.

a. Package 11 Paladin Version 11.0.

1). Setup instructions at the AFATDS system. for Paladin Version 11.0.

a). Create a new communications net with these settings ONLY

(1). Network Name - Operator choice
(2). Local Address - Operator choice
(3). Protocol - AFCS
(4). Security - Secure
(5). Media Device - SINCGARS Radio
(6). Data Encoding - FSK 1200/2400
(7). Data Rate (BPS) - 1200
(8). Key Time (sec) - Current Paladin 2.1

b). The settings available on the "more" screen will default to these correct values, they should not be changed.

(1). Block Mode - Single
(2). Error Control - EDC/TDC
(3). Net Access Delay - All settings should be 0.5

c). Add Paladin Units to the Destination Units List and Edit Routes.

(1). Associate the Primary/Direct network to the net created in step 1.
(2). Destination Address - Up to 8 Paladin units may be associated with a single destination address.
(3). Gun Plt/Sect - Each Paladin unit associated with the above destination address must have a unique platoon/gun number associated with it.

d). The radio's data mode must be set to TF. Either Single Channel/Plain Text or Cipher Text/Frequency Hoppings may be used.

2). Setup instructions at the Package 11 Paladin howitzer for Version 11.0.

a). The AFCS net type to be used is 14. This creates a net with the settings that will work with the above AFATDS AFCS net.

b). The Key Time for the net must be set at 0.7.

c). The Net Access Delay should be unique for each Paladin unit. It is recommended that the following values be used:

Gun Plt/Sect	NAD
1/1	1.0
1/2	1.5
1/3	2.0
1/4	2.5
2/1	3.0
2/2	3.5
2/3	4.0
2/4	4.5

d). The AFCS Broadcast Address should be set to the value selected during the AFATDS Edit Routes for the unit.

e). The AFCS Physical Address is not used, but is required. A value not used on the network should be selected.

f). At the AFCS, the Gun Plt/Sect entry must be equivalent to the value selected during the AFATDS Edit Routes for the unit.

g). The BCS Address must be equivalent to the AFATDS Local Address.

h). Ensure the Primary BCS is selected for use.

i). The URN for the unit must match the value used in the AFATDS system.

j). The URN for AFATDS must match the value used in the AFATDS system.

k). Due to a problem with the Paladin communications setup, the following steps are required to ensure all values are saved:

(1). After all values are set for the communications, change the net type to 1 (one).
(2). Press Use All on the NET ACCESS screen and the NET ADDRESS screen.
(3). Change the net type back to the original number (14).
(4). Press Use All on the NET ACCESS screen and the NET ADDRESS screen.

l). If the AFCS Physical Address, Broadcast Address or Gun Number are changed, step k must be repeated.

b. Package 11 Paladin Version 11.1.

1). Setup instructions at the AFATDS system. for Paladin Version 11.1.

a). Create a new communications net with these settings ONLY

(1). Network Name - Operator choice
(2). Local Address - Operator choice
(3). Protocol - AFCS
(4). Security - Secure
(5). Media Device - Operator choice
(6). Data Encoding - Operator choice
(7). Data Rate (BPS) - Operator choice
(8). Key Time (sec) - Use system default

b). The settings available on the "more" screen will default to the correct values, if needed Block Mode may be changed to Double, but this must be set at the AFATDS an all Paladin devices.

c). Add Paladin Units to the Destination Units List and Edit Routes.

(1). Associate the Primary/Direct network to the net created in step 1.
(2). Destination Address - Up to 8 Paladin units may be associated with a single destination address.
(3). Gun Plt/Sect - Each Paladin unit associated with the above destination address must have a unique platoon/gun number associated with it.

d). The radio settings should correspond to the values used to create the AFCS network.

2). Setup instructions at the Package 11 Paladin howitzer for Version 11.1.

a). ONLY AFCS net types 1 thru 21 may be used, net types 22 thru 52 are 188-220A protocol net types and will not work.

b). The Key Time for the Net must be set at the same value as the AFATDS system default.

c). The Net Access Delay should be unique for each Paladin unit. It is recommended that the following values be used:

Gun Plt/Sect	NAD
1/1	1.0
1/2	1.5
1/3	2.0
1/4	2.5
2/1	3.0
2/2	3.5
2/3	4.0
2/4	4.5

d). The AFCS Broadcast Address should be set to the value selected during the AFATDS Edit Routes for the unit.

e). The AFCS Physical Address is not used, but is required. A value not used on the network should be selected.

f). The AFCS Gun Plt/Sect. but be equivalent to the value selected during the AFATDS Edit Routes for the unit.

g). The BCS Address must be equivalent to the AFATDS Local Address.

h). Ensure the Primary BCS is selected for use.

i). The URN for the unit must match the value used in the AFATDS system.

j). The URN for AFATDS must match the value used in the AFATDS system.

k). Due to a problem with the Paladin communications setup, the following steps are required to ensure all values are saved:

(1). After all values are set for the communications, change the net type to 1 (one).
(2). Press Use All on the NET ACCESS screen and the NET ADDRESS screen.
(3). Change the net type back to the original number (14).
(4). Press Use All on the NET ACCESS screen and the NET ADDRESS screen.

c. Paladin Net Types for the AFCS Protocol.

Table 16. Paladin Net Types for the AFCS Protocol

Net Type Rate	Protocol	Device	Modulation	Baud Rate
1	AFCS	Wire	CDP	8000
2	AFCS	Wire	CDP	16000
3	AFCS	Wire	CDP	32000
4	AFCS	Wire	1200/2400	600
5	AFCS	Wire	1200/2400	1200
6	AFCS	Wire	1300/2100	600
7	AFCS	Wire	1300/2100	1200
8	AFCS	Radio	NRZ	600
9	AFCS	Radio	NRZ	1200
10	AFCS	Radio	NRZ	2400
11	AFCS	Radio	NRZ	4800
12	AFCS	Radio	NRZ	16000
13	AFCS	Radio	1200/2400	600
14	AFCS	Radio	1200/2400	1200
15	AFCS	Radio	133/2100	600
16	AFCS	Radio	1300/2100	1200
17	AFCS	Radio/KY57	NRZ	16000
18	AFCS	Radio/KY57	1200/2400	600
19	AFCS	Radio/KY57	1200/2400	1200
20	AFCS	Radio/KY57	1300/2100	600
21	AFCS	Radio/KY57	1300/2100	1200

C. <u>Cannon Fire Mission Processing</u>.

1. Guidances. AFATDS uses a collection of guidances to process fire missions. The application of these are described in detail in the Mechanics of Fire Mission Processing Appendix of this publication.

2. Mission processing preferences. Because of the limitations posed by artillery safety, during training exercises firing is frequently restricted to a single charge and angle of fire. To address this need the Mission Processing Preferences was added to AFATDS logic.

   a. Click Mission Processing, Mission Processing Preferences. The Mission Processing Preferences window opens.

   b. This window allows the selection of an angle of fire and specific propellant model, lot and charge. If specified, AFATDS will use these values when determining ballistic solutions. The operator can over ride these values by specifying angle of fire, propellant model, or lot charge in the fire mission data. If AFATDS cannot determine a solution using specified parameters, it returns an incapable result.

3. Attack analysis level is set to detailed.

   a. On the Current window, click Mission Processing, Attack Analysis Level, Detailed.

   b. The detailed selection remains grayed-out indicating the level of analysis in use.

4. A fire mission is received as a fire request (FR) from an observer or FSE or as an order to fire (OTF) from an FA CP to a Paladin FDC or as a fire order (FO). This fire mission message is checked for validity and filtered:

   a. Filter checks are performed against the target. These determine if the target should be processed as a fire mission or denied. The checks performed depend upon previous processing at other stations (e.g., has the mission passed through an FSE or FA CP before being received at the cannon unit). This is denoted by the type of message received (FR, OTF or FO).

5. Target Selection Standards. Select TARGET SELECTION STANDARDS. Target selections standards provide the minimum criteria that a target report must match in order to pass TSS checks in processing. There are two target selection criteria.

   a. MAX TLE (target location error) is the greatest radial error, in meters, that is acceptable for a report of a target to be attacked or planned. This value is assigned to the target based on the TLE of the reporting agency.

b. MAX RPT AGE (maximum report age), in minutes, is the time the target is expected to remain at the reported position.

c. CHECK CALLS FOR FIRE AGAINST TSS allows the operator to cause not only ATI reports but also calls for fire to be checked against these criteria. If this box is not checked, all fire missions pass the TSS check If this box is selected, FR but not OTF or FO will be checked.

d. The following mission types always pass TSS checks during fire mission processing:

-Immediate smoke
-Immediate suppression
-Coordinated Illumination
-Continuous illumination
-Registration
-Missions requesting illumination, FASCAM or smoke.

6. Target Duplication Guidance. Suppose two FOs on either side of a battalion boundary observe and request fire on the same target at the same time. Target duplication guidance prevents the computer from engaging a target that is already active. This check applies only to missions received as FR, OTF or FO.

a. ANY TARGETS WITH SEPARATION DISTANCE LESS THAN is the radius from an existing active target that describes a circle. Inside this circle any new target will be considered a duplicate and the computer will recommend DENY.

b. SIMILAR TARGETS WITH SEPARATION DISTANCE LESS THAN provides the distance within which targets of the same type but differing detailed description will be considered duplicates. For example, ARTY, MED and ARTY, TOWED are similar targets.

7. Target Exclusion. Recall that targets could be excluded in the Target Management Matrix. This function of TMM actually acts a filter causing missions requested on these type targets to be denied. This check applies to missions received as FR but not OTF or FO.

8. Targets with IEW Routing. Another filter function that falls under the Target Management Matrix is IEW routing. This function causes the computer to request clearance on fire missions for the targets marked for IEW routing. The purpose of this function is to cause electronic warfare assets to be alerted to the potential destruction of targets that

may be intel sources or targets of intel operations. The destination of the routing must be established separately. This check applies to missions received as FR but not OTF or FO.

9. Target Build Up Area (TBA). This filter refers to a geometry. The TBA defines an area and associates targets with the area. A threshold number is assigned indicating that quantity of targets that must be identified in the area before the computer would assign a fire mission to a request. This check applies to missions received as FR but not OTF or FO.

10. Mission Precedence is determined from the Guidances, Target, TMM window. Precedence of Pr (priority; FPF and Copperhead priority missions) are scheduled above all other missions and each priority mission is processed in a first in, first out order. I (immediate) missions are processed next in mission value order and A (as acquired) are processed last, again based on mission priority. If the priority is changed to P (planned), the mission is not processed and the target is added to the Planned target list when Accept Recommendation is selected. Mission precedence is assigned based on these rules.

a. Missions received with a precedence of Normal are assigned "As acquired" precedence.

b. If the fire request indicates "Urgent" precedence, AFATDS assigns the mission as an "Immediate Suppression" mission. The exception to this rule is that "Immediate Smoke" is assigned at AFATDS if the FFE munitions requested are smoke munitions.

1). "Assign FPF" missions become "Assign" missions with a precedence of "Priority." These are processed at AFATDS as FPF missions unless the FFE munitions requested are Copperhead. In this instance the mission is processed as a Copperhead Priority mission.

2). If no precedence is received in the fire request, AFATDS resorts to the TMM guidance to determine one. If the TMM indicates "P" (plan), AFATDS will assign the fire request an as acquired precedence.

3). Finally, AFATDS will compare a requested precedence to that assigned in the TMM guidance. If the two differ, the higher precedence will be used.

11. NLT TIME. The gun must be able to engage the target before the NLT time. The not later than time for a mission is computed in one of two ways:

  a. If the mission is a TOT, the NLT equals the TOT time.

  b. If the mission is not a TOT, the NLT is computed by adding the time the target was located or generated (Time Sensed entry) to the target decay time stored in Guidances, Miscellaneous, Target Decay Time.

12. Mission value is computed based on guidances. This computation is described in detail in the Mission Processing: Mission Value section of this notebook.

13. AFATDS determines the units available to fire the mission by examining the fire unit for all guns that are available. This means the following:

  a. For a Paladin unit, add all guns that are commanded by the OPFAC and have a status of ready.

  b. For a non-Paladin unit, add all guns that are stored in the OPFAC's Weapons folder with a status of ready.

14. Shell/Fuze Selection. Ammunition is assigned based on the following preferential ordering.

  a. Assign ammunition requested in call for fire, fire request or order to fire as first choice.

> **NOTE!**
>
> **If propellant model and charge are specified for low angle Copperhead missions, they will be ignored. AFATDS (NABK) selects the optimum charge based on range to target, cloud ceiling, and visibility.**

  b. Assign munitions specified in the FS System Tasks guidance.

  c. Assign ammunition listed in FA method of attack tables as second choice.

  d. Assign shell/fuze based on JMEM calculations.

e. Assign ammunition determined from programmed mission characteristics table as third choice. If any of these choices cannot be supported, the computer resorts to the next choice ammunition.

NOTE!

When a mission is processed, AFATDS "reserves" the ammunition needed to fire the mission, so that it is not considered available for subsequent mission processing. When the mission is completed (Mission Fired Report received and processed), AFATDS removes the ammunition reservation.

f. AFATDS will use this selection criteria to process munitions choices until a capable solution is found or three choices for each weapon has been examined or all munitions choices have been exhausted. If a capable solution is not determined at the end of this process, a recommendation of "Deny, no capable options" is determined. If the munitions requested in the fire request/order to fire are special munitions (Copperhead, FASCAM, smoke, improved WP or Illum), only the specified munitions are checked. This prevents the assignment of other munitions (such as HE assigned when an illum mission was requested.)

g. After specific types of munitions have been selected, the ammunition inventory is checked and the following rules apply to select a projectile model and lot based on the mission type as follows:

1). If the mission type is not Adjust, then select a range capable (based on the Fire Unit's weapon model and munitions model) projectile model/Lot that has registration corrections available. If multiple models/Lots have registration data then select the Projectile Model that has the least max range capability that can still reach the target. If there are multiple Lots of that munitions model then select the Lot that has the greatest quantity.

2). If the mission type is not Adjust and there is no registration data for any projectile models in the given category, then select the Projectile Model that has the least max range capability that can still reach the target. If there are multiple

Lots of that munitions model then select the Lot that has the greatest quantity.

3). If the mission Type is Adjust, then select a range capable (based on the Fire Unit's weapon model and munitions model) projectile model/Lot that does not have registration corrections available. Select the Projectile Model that has the least max range capability that can still reach the target. If there are multiple Lots of that projectile model then select the Lot that has the greatest quantity.

h. Select the FFE Fuze Model. The fuze model selected must be legal for the projectile model selected. If the given fuze category is in the "Time" category, and the mission type is not adjust, and the selected FFE projectile has registration data, then select the time fuze model that is listed for that projectile's registration data. If no registration data (for a legal time fuze model) exists then select the time fuze model/lot with the greatest quantity.

i. Select the Adjust Projectile Model. A compatible (ballistically similar) Adjust projectile model must be selected for Adjust fire mission types (based on the munitions characteristics). Using the given Adjust projectile munitions category, apply the following rules:

1). If the Adjust projectile category is in the same category as the FFE category, the adjust projectile model will be the same as the FFE1 munitions model that was determined above.

2). If the adjust munitions category is different from the FFE munitions category, then select a compatible munitions model in the given category. The lot for the selected model will be the lot with the greatest quantity.

j. Select the Adjust fuze Model. A legal fuze model must be selected for Adjust fire projectile model. Using the given Adjust projectile munition category, apply the following rules:

1). If the Adjust fuze category is in the same category as the FFE fuze category, then the adjust fuze model will be the same as the FFE1 fuze model that was determined above.

2). If the adjust fuze category is different from the FFE fuze category, then select a compatible fuze model (for the adjust projectile model) in the given fuze category. The lot for the selected model will be the lot with the greatest quantity.

15. Volume of fire determination. The volume of fire is determined for each munitions-weapon pairing.

a. For effects type targets, if a volume of fire is specified in the fire request or order to fire, this is tried first.

b. For effects type targets without a volume of fire specified in the fire request, effect processing is used to determine the volume of fire.

c. For a volleys type target received with specified munitions but no quantity, the volume of fire is set to 1 volley.

d. The volume of fire for Copperhead missions is based on the target strength. AFATDS assigns one Copperhead round to each target reported to a maximum of six rounds for a strength of six or more.

16. Weapons Assignment. AFATDS applies the following steps to select the weapons to fire.

a. All available weapons with a status of Ready or Not Given are initially considered.

b. If the pieces to FFE are specified, only these weapons are considered.

c. If the mission is a Copperhead mission, check unit data and only Copperhead capable weapons are considered.

d. If the mission is a priority Copperhead mission, remove weapons that currently have a Copperhead priority mission assigned.

e. Rank weapons remaining based on weapon's mission load and state:

1). Weapons with no missions assigned.

2). Weapons with missions at EOM.

3). Weapons in Cease Loading.

4). Weapons with missions in Do Not Load status.

5). Weapons busy in fire mission.

f. Determine number of weapons required based on method of fire.

g. If the mission is an illumination mission, select number of weapons from the rank ordered list based on mission type:

1). 1 GUN => 1 weapon.

2). 2 GUN => 2 weapons.

3). 2 GUN LATERAL => 2 weapons.

4). 2 GUN RANGE => 2 weapons.

5). 4 GUN RANGE AND LATERAL => 4 weapons.

6). If illum is specified for the mission but no method of control is given, 1 weapon is assigned.

h. For non-illum missions, select the required quantity of weapons from the ranked list.

1). If no weapons can be selected, display an incapable option at intervention, other wise check if an adjust mission.

2). If adjustment is not required send selected weapons to compute technical solution. If adjustment is required select an adjusting piece:

a). If an adjusting piece is specified, assign that piece or if adjusting platoon is specified, assign that platoon, or if 2 gun, assign the highest ranked pieces.

b). If the adjusting piece is not specified, select from the highest ranking. This selection process will not select a piece adjusting another mission. If more than one piece is highest ranking, the process selects lowest numbered piece and this rotates through all pieces as subsequent missions are fired.

c). If no adjusting piece can be selected, display an incapable option at intervention. Otherwise, compute technical solution for selected pieces.

3). If the AFATDS operator desires to change AFATDS selected adjusting piece, he must recalculate the fire mission at the intervention and designate a different gun on the More Mission

Data window. This can be done at intervention for the initial round or any subsequent adjusting round.

17. Propellant Selection. Propellant selection is performed for all weapons of the fire unit. The selection process performs the following.

> **NOTE!**
>
> **Mission Processing Preferences (Found on the Current window by clicking Mission Processing, Preferences) allows the designation of Propellant Model, Lot and Charge, as well as angle of fire to be used in mission processing. The Preferences are intended to support mission processing during training exercises where safety considerations limit firing to a single charge and trajectory. If Mission Processing Preferences are stored, these pre-empt further propellant selection as described below.**

a. If the propellant model, lot and charge were specified, these are used in the ballistic solution. If these are specified and no capable solution can be determined, no further processing takes place and an incapable option is presented to the operator.

b. Otherwise, AFATDS examines all propellants for consideration that are on-hand at the fire unit in a quantity equal to or greater than the number of rounds required to engage the target. AFATDS provides data on available propellants to NABK, which applies Fire Control Input (FCI) rules to select the optimum propellant model, lot, and charge for the mission.

> **NOTE!**
>
> **Because charge selection for 155mm Copperhead is based on cloud height, observer visibility and shaped trajectory requirements, charge selection of Copperhead missions is always performed by AFATDS. This selection cannot be overridden by an operator entered charge.**

18. Application of Registration Data. AFATDS provides all registration data on file to NABK, which applies FCI rules to determine which

registration corrections, if any, should be used in computing the ballistic solution for the mission.

NOTE!

AFATDS applies registration corrections based on the charge, ammunition, trajectory, meteorological message in use and transfer limits. For most ammunition, a match in projectile family is required to allow a registration correction to be applied to firing data. However, M107 155mm HE registration corrections may be applied to M483A1 DPICM and M825 Improved WP. A similar transfer of correction from M1 105mm HE does not occur for M916 105mm DPICM firing data.

19. Application of Meteorological Data. AFATDS applies meteorological data from the current computer met message stored in the database. To print the Computer MET (CM), select "Print...", in the View CM MET window. Highlight the printer, name the print job and select the OK button. In lieu of valid meteorological data, a standard met is used as current. The standard met data stored in AFATDS reflects the International Civil Aviation Organization (ICAO) standard as it is used in all US fire control information. This data uses 0 meters for the altitude of the meteorological datum plane (altitude of the met station). It should be noted that tabular firing table standard conditions imply that there is no altitude difference between the MDP and battery altitude. To replicate standard met conditions in the firing data, the standard met MDP altitude should be edited to reflect the battery location altitude.

20. Application of MVV Data. MVV data on file is provided to NABK, which applies FCI rules to determine which MVV data, if any, should be used in calculating the ballistic solution.

NOTE!

The AFATDS operator accesses the MVV Calculator from the Detailed Unit Information window. Each field in the MVV Calculator must be filled in with the proper projectile/fuze combination. The Muzzle Velocity Correction Tables (MVCT-1) gives the operator a Standard Muzzle Velocity entry, which is used to compute the variation.

21. Near Crest Clearance (XO's min QE application). Mask violations are checked by first determining the trajectory to the target.

a. A mask violation exists if the QE to fire does not clear the crest by 5 meters plus 2 values of fork for shells fuzed with all but VT fuzes.

b. VT fuzed munitions are checked as for all other fuzes if the time of flight to the mask is more than 5.5 seconds less than the fuze setting to fire. However, if the difference between the time of flight to the mask and fuze setting is less than or equal to 5.5, the trajectory must clear the crest by 100 meters and 2 values of fork. The associated QE is reduced by one value of fork. If this modified trajectory is computed to be lower than the mask at the piece to crest range, a mask violation is identified.

c. Down range mask violations are checked by determining the trajectory to the target. The height of this trajectory is checked against down range mask geometries. If the trajectory violates the down range mask, the option is marked as incapable and an N is placed in the Range Capable column on the Attack Options tab.

d. If no solution results from a near mask violation, and the charge increment to fire was not operator specified, NABK recycles the mission trying the next lower charge.

22. ACA checks. In addition to the coordination checks performed at any AFATDS, the first AFATDS performing technical fire direction compares the computed trajectories to ACAs. This check is performed in three dimensions. Trajectories fired below or above the ACA are not considered violations.

23. Windows associated with cannon technical fire direction.

a. Intervention window, Cannon Technical Solution tab**.** The Intervention form differs at a cannon fire unit from that displayed at CPs and FSE/FSCCs in that the Cannon Tech Soln tab is activated. Selecting the Cannon Tech Soln tab displays the firing data computed for the mission. This data is displayed in the following format.

1). TOF field displays the time of flight in seconds.

2). FFE1 table always displays data for the fire for effect shell/propellant/fuze combination. During the adjustment phase of an adjust fire mission, the firing data displayed for the "pieces to follow" is that of the adjusting piece. The data is displayed in the following columns:

a). Wpn displays the gun number for that row of data.

b). Cap indicates the options as capable with a "Y" and uses the same color code as the Attack Options on the Intervention tab.

c). MOC provides the method of control. DNL or Do Not Load, is displayed for pieces to follow during an adjustment.

d). # RNDS is the number of rounds assigned to this weapon. "0" is displayed for pieces to follow.

e). Shell Category is the type of projectile.

f). Shell Model refines the category to a specific model.

g). Shell Lot is the single alphabetic character assigned as the lot in the Munitions folder of the unit information.

h). Prop Color indicates the charge type as GB, WB or RB (green bag, white bag or red bag, respectively).

i). Prop Lot is the single alphabetic character assigned as the lot in the Propellants folder of the unit information.

j). Prop Charge indicates the propellant charge increment to fire.

k). Fuze Category is the type of fuze to fire.

l). Fuze Model refines the category to a specific model nomenclature.

m). Fuze Lot is the single alphabetic character assigned as the lot in the Fuzes folder of the unit information.

n). Fuze Time is the fuze setting in increments of time. If the fuze does not require a setting (e.g., PD) the time is displayed as "0.0."

o). DF is the deflection to fire.

p). QE is the quadrant elevation to fire.

3). FFE2 repeats this information for a second shell if the mission requires a second fire for effect shell.

WARNING!

If your OPFAC is managing Cannon weapons (GDU equipped or Paladins) and you want to use a different solution then the AFATDS recommendation, - you must "Recalculate" the mission (optionally specifying the specific howitzer(s) or Launchers that you want to use). Do not use the "Send" option. This will ensure that AFATDS can correctly determine ballistic solutions and perform trajectory related checks (Air space near & downrange masks).

WARNING!

If your OPFAC is managing Paladins and multiple fire missions have accumulated in the IP - you should "Recalculate" each mission before accepting the recommendation. This will ensure that AFATDS uses the latest mission (current mission assignments at the weapons) and unit data.

IMPORTANT!!

When a fire mission is in Check Fire, an operator can view the fire commands. If the operator sends the fire commands to the GDUs, the newly received fire commands will override the previously Check Fired fire commands and the mission can be fired.

b. Weapon Status Paladin and Weapon Status GDU icons on the Current tool bar. The Weapon Status Paladin window is displayed by clicking the Weapon Status Paladin icon on the Current tool bar. Similarly, Weapon Status GDU icon accesses the Weapon Status GDU window. These windows portray the status of weapons as they relate to active fire missions in the following format.

1). Each row of the upper display represents a fire mission. Up to twelve weapons columns cross index the rows to show the weapon's current status in the mission as **A**, adjusting or **F**, following or firing the mission.

2). When a mission row is highlighted, the specific status of that mission is shown in the lower display:

a). DATA/ACK (displayed only on the Weapon Status GDU window shows an "*****" when fire commands are transmitted to the weapon and changes to "**X**" is no ack is received. Otherwise, the "**[]**" is displayed indicating an ack from the gun.

b). READY shows an "*****" when fire commands that require a ready response from the gun, such as TOT or AMC missions, are transmitted. If ready is not received, this column displays "**X**" . Otherwise, the column displays "**[]**" when the ready report is received. For WR missions, this symbol changes when the DATA/ACK entry changes and polling for shot begins.

c). FIRE/SHOT shows an "*****" while waiting for a shot report from the gun. This changes to "**X**" if no report is received. Otherwise, the "**[]**" is displayed indicating reception of shot from the GDU. Receiving shot causes the display to poll for rounds complete in a multiple volley mission.

d). RDS COMPLT shows an "*****" while waiting for a rounds complete report from the gun. This changes to "**X**" if no report is received. Otherwise, the "**[]**" is displayed indicating reception of rounds complete from the gun.

3). The following button provide additional fire mission related capabilities.

a). SHOT, SPLASH, RDS COMPLT buttons allow these commands to be manually applied to the mission and are designed to be used when gun communications have failed.

b). FIRE is activated for the selected mission if the method of control requires the FDC to command firing and the ready reports has been received from the gun.

c). EOM sends end of mission for the selected mission.

d). VIEW FIRE COMMANDS redisplays the fire commands for the selected mission.

e). DENY denies the selected mission.

D. Registration Missions.

1. Capabilities. AFATDS processes registration missions, then determines and stores registration corrections for these missions. The following are required to allow AFATDS to control and process a registration.

a. The AFATDS OPFAC must be a non-Paladin fire unit with weapons stored in the unit's weapon folder or a Paladin FDC established in the AFATDS workstation as an FACP controlling individual, one-gun fire units.

b. The registration must be initiated at the AFATDS OPFAC. An external system (such as observer with a forward entry device) cannot initiate the mission with a call for fire.

2. Procedure. The general procedure for the conduct of a precision or high burst/mean point of impact registration is described below.

a. Prior to initiating the mission, the operator should create a named target list (named "REGPOINTS" or some similar descriptive name) and add the registration point location to this target list. Target type should be terrain feature, size should be point. This target should be kept on file for as long as the registration is valid. The location is needed to perform "concurrent updates" of registration corrections. If desired, the registration point can also be added to the known point list, if desired.

b. The AFATDS operator displays an Initiate Fire Mission window by selecting Mission Processing, Initiate Fire Mission on the Current window.

c. The operator enters the registration point target number.

1). The appropriate mission type is selected for the registration.

a). Precision Registration

b). Precision Registration, Quick and Time

c). Mean Point of Impact

d). High Burst

e). Radar High Burst

f). Radar MPI.

d. The observers or radar, registration shell and lot, registration fuze and lot and registration propellant, charge and lot, and gun are entered.

e. Processing begins when the AFATDS operator selects the Analyze Target button. A number of events occur at this point.

1). If coordination is required, the request for coordination is transmitted.

2). If no coordination is required, or when coordination is approved, the message or messages to observer are transmitted.

3). The Registration Mission Info window is displayed.

f. When the observers associated with the mission have reported Ready to observe, and after the above events, the Send Fire Cmds button activates on the Registration Info window. The AFATD operator clicks this button to send fire commands to the registering weapon.

g. The Shot report is received from the weapon and relayed to the observer. The receipt of “shot” causes AFATDS to begin a countdown that transmits the Splash report when the time of flight minus 10 seconds has expired.

h. When the observers have spotted and corrected the burst (for a precision registration) or provided sensings (for an HB/MPI registration) these are displayed in the SENSINGS list of the Registration Info window. Any time after the first spottings or sensings have been received, the operator may select to compute and store registration corrections.

i. The AFATDS operator controls mission execution by selecting the "send fire commands" button. Whenever he does this, the current fire commands are sent to the registering gun. For a precision registration, AFATDS computes new fire commands based on the observer correction for every round fired. The operator sends these to the gun, the gun fires. Shot and splash are automatically sent to the observer. Special commands ("record as registration point, time repeat, record as time") are displayed as check boxes on the Registration Mission Information window.

For a HB/MPI, radar, or laser registration, the process is the same, except that AFATDS does not recompute firing data. The same data is fired for every round. The process continues until the operator is satisfied with the results of the registration. Corrections can be re-computed at any time. When sensings (rounds) are displayed, they are shown with a checkmark in the "Accept" column. When the operator selects "compute", AFATDS averages the burst locations, determines which, if any, fall outside of prescribed probable error limits, and alerts the operator (e.g. "rounds 2, 5 should be rejected"). To accept the recommendation, the operator clicks on the checkbox for rounds 2 & 5, which removes the check mark, and selects "compute corrections" again. AFATDS computes new registration corrections, ignoring rounds 2 & 5. The operator may ignore the AFATDS recommendation by simply leaving the check marks in place, or he may reject any round he chooses by removing the "accept" checkmark.

To store registration corrections, the operator selects the "store corrections" button. If the operator tries to end the mission without storing corrections, a warning message is displayed. The mission is not ended until the operator okays the warning.

The registration mission is ended by the AFATDS operator. End of mission is initiated when the AFATDS operator selects the End Of Mission button on the Registration Info window.

3. Perform Concurrent Update of Registration Corrections

a. Operator determines that an update of registration data is needed due to change in concurrent conditions (e.g. concurrent MET becomes available, new MVV for registering gun is determined, survey update of registering gun location, etc.)

b. Operator updates current unit, MET, and/or target data to reflect conditions concurrent with the registration. This may include updated MVV data for the registering gun, updated location for the registering gun, new MET, updated registration point location (precision registrations only).

c. Operator edits registering cannon unit. Selects the Registrations folder. Selects Edit for the registration to be updated.

d. Operator selects the Update button. AFATDS automatically computes new registration corrections based on updated data, and populates the registration window with new data.

e. To store and apply the new registration corrections, the operator selects OK. To leave registration data unchanged, he selects Cancel.

Tactical Fire Control for MLRS Units

General

AFATDS provides battalion, battery and platoon level technical fire control of MLRS units. AFATDS retains the capability to interface with the Fire Direction System (FDS) system for units equipped with the FDS system.

Tactical Fire Control for MLRS Units

MLRS Functionality in AFATDS

A. General.

AFATDS 99 has the capability to perform processing functions currently done at the MLRS Fire Direction System (FDS). AFATDS is able to communicate directly with the Fire Control System (FCS) on each individual launcher. Several new or modified messages have been added to AFATDS to assist in the communications with the FCS on each individual launcher. The following new messages were added:

1. Database Update Message
2. MLRS Command Message
3. MLRS Request Message

The following messages were modified for communication with the FCS:

1. Call For Fire (CFF)
2. Mission Fire Report (MFR)
3. Launcher Status Message
4. Mission Status Message

The addition of the new messages and modifications to the existing ones will better allow AFATDS to control individual MLRS launchers on the battlefield. Each individual launcher will be built into the Current Situation as a single unit on the map. Changes have been made to the unit data to track individual launcher information to allow for improved attack analysis.

Since individual launchers will now be controlled by AFATDS, attack analysis is performed against the capability of each launcher instead of the entire platoon. The analysis will take in to consideration the launcher status, uploaded rockets, location, range to target, and target type. In addition to this, an individual launcher may be tasked to directly support a specific FSE for ATACMS fire missions or other special situations.

Individual launchers will be considered when calculating Schedule of Fires. In addition to determining the launcher's capability to attack the target, the dwell time and mission cycle time will also be considered when selecting a launcher to be included in the schedule of fires.

B. Requesting Database Information From an MLRS Launcher (SPLL).

When AFATDS is directly communicating with the Fire Control System (FCS) on the MLRS SPLL, AFATDS is able to query and receive database information from the SPLL.

The AFATDS operator is able to query the launcher by selecting the launcher icon on his current situation map. Once the launcher icon is selected, the right trackball button displays the pop-up menu. The operator then selects the "Request Status" on the pop-up menu. This displays the "FCS Request" message. The information on the FCS Request message identifies the launcher that was selected ("Request Status From:").

A drop down window in the message allows the operator to select the information he wishes to request from the launcher. The operator then selects the information he wants from the launcher by selecting one of the drop down items listed. Selecting the SEND button on the message sends the Request Status message to the MLRS SPLL. The selections on this message are:

1. SPLL Status: The current status of the SPLL selected to include whether the launcher is Ready, Out of Action, Moving, Not Given, Cool, or Degraded.
2. Reload Point Locations: The reload points associated with the selected launcher.
3. Firing Point Locations: The firing points associated with the selected launcher.
4. Rendezvous Point Locations: The rendezvous points associated with the selected launcher.
5. SCP Location: The Survey Control Point (SCP) closest to the launcher.
6. Masking Data: All mask data for the firing points associated with this launcher.
7. Hide Point Locations: The hide points associated with the selected launcher.
8. Location Database Update: The response from the launcher will include all point data and the closest SCP.
9. Configuration: The launcher configuration is displayed.

C. Amending an MLRS Mission in Progress.

If an MLRS mission has been initiated with a Method of Control of Warning Order and new target location information is received after the mission has been initiated, the operator is able to accept the new target location information from the sensor and update the target location. To amend the mission in progress, display the active target list, select the target from the list and select edit. The operator can then change the target location. When the Basic Target Information window is OKed, AFATDS will generate and send an amended call for fire (MLRS;CFF) to the SPLL. The operator can verify the SPLL's receipt of the message by displaying the MLRS Status Window**.**

D. AFATDS Actions When Receiving Inoperative Codes From an MLRS Launcher (SPLL).

When an operator requests the launcher status from a MLRS, the MLRS will transmit if it is: Ready, Out of Action, Moving, Not Given, Cool, or Degraded. AFATDS will use the information provided by the SPLL to end a previously assigned mission if it is Out of Action or limit the selection of that launcher during attack analysis for future missions. If AFATDS determines that the launcher can no longer complete the mission, an end of mission (EOM) will be sent to the launcher and a "deny" message will be sent to the intervention point of the local OPFAC responsible for that launcher.

Tactical Fire Control for MLRS Units
Mission Processing for Missiles

AFATDS performs special processing when analyzing missiles (ATACMS Block 1 APAM, ATACMS Block 2 APAM, ATACMS BAT, ATACMS PSAM, and EFOGM) for use on a target. Specific processing related to each type of missile is discussed below along with general behavior related to ATACMS analysis. The execution of Warning Order missions established for ATACMS can be tied to the Stay Hot Shoot Fast (SHSF) capabilities so that "Fire" commands can be generated automatically, see the Stay Hot Shoot Fast section in Appendix F.

A. <u>General Points About ATACMS & EFOGM</u>.

1. Specifying ATACMS or EFOGM munitions for a specific mission may be done in the Fire Mission | MOE window.

2. Attack guidance may also specify ATACMS or EFOGM. These include the FS Tasks matrix and rocket/Missile Attack Methods Tables.

3. AFATDS attack analysis will consider ATACMS-APAM when DPICM is specified, but not capable, and will consider ATACMS-BAT when TGW is specified, but not capable.

4. When AFATDS attack analysis recommends an ATACMS attack option, the attack option is only presented at the intervention point (IP), if intervention is turned on.

5. Upon selection of an ATACMS attack option the AFATDS OPFAC will be redesignated as the mission observer. If the mission originated at another OPFAC/unit, notification of the observer redesignation is sent to the original observer.

6. ATACMS attack options default to a warning order (WO) method of control.

    - The WO method of control allows an OTF/FO to be processed through the mission chain to the MLRS launcher while coordination is pending, and allows the observer OPFAC to process target updates.

- The last AFATDS OPFAC in the mission chain will send a CFF with AMC method of control to the fire unit FDS.

- The TAH and PAH will be generated at the first unit to select the firing unit. If the BN is running detailed analysis, it will generate the TAH and PAH geometry. The Missile Flight Path (MFP) geometry will also be generated. However, at this time the MFP can only be distributed between AFATDS units. The MFP provides the Flight Path time of flight data. The PAH and TAH will be automatically forwarded to the observer OPFAC, and to units in the data distribution list associated with "This Unit"/"PAH-TAH".

- When coordination is approved or overridden, the observer OPFAC can change the method of control to when ready, AMC or TOT.

- Upon receipt of a Ready Command from the fire unit, the observer can send a fire command to the fire unit. (The operator must verify that coordination has been approved/overridden prior to sending the fire command).

- Upon receipt of an OPSTAT (with Mission Fired Indicator field entered) from the fire unit FDS, the AFATDS fire unit will generate a MFR and forward it through the mission chain. An MFR or Deny message will purge the PAH and TAH geometries.

NOTE!

When AFATDS receives a fire request that does not specify ATACMS, but AFATDS selects ATACMS to use on the target, the AFATDS OPFAC that selected ATACMS will become the observer for the mission (in other words, an AFATDS OPFAC will always control an ATACMS mission).

NOTE!

If you select "send" (rather than "OK) on an Initiate Fire Mission (IFM) window for a mission specifying ATACMS, you will remain the observer for that mission (you are still responsible for selecting the "Fire" option when its time to fire the missile). Also, when you "send" a mission your OPFAC

will not perform any coordination checks on that target. (This is because you did not process the mission at your OPFAC.)

B. Segmenting Large Targets When Using ATACMS BAT. AFATDS will segment large area targets into "sub targets" during attack analysis with ATACMS BAT. These sub targets will each be assigned a target number (from your OPFAC's target number block) and be analyzed for attack. In general, AFATDS will segment large targets so that the sub targets have a size of 6000 x 5000 meters or less. For example, your OPFAC receives AB1020 at 10,000 x 3000 meter target with a strength of 100 for ATACMS BAT analysis. Your target number block is XX1000 - XX2000. To analyze this target, AFATDS segments AA1020 resulting in two "children" sub targets (XX1000 and XX1001). Each "child" target has a size of 5000 X 3000 and a strength of 50. The children targets will each be analyzed (based on the level of attack analysis) in order to assign fire units and volume of fire. Note that targets with a strength greater than 70 also require segmentation on segments.

AFATDS will also segment one last time (if warranted) by the volume of fire. No ATACMS sub target will have more than two aimpoints and more than four missiles. The first aimpoint will be placed 25% from the leading edge of the target segment. The second aimpoint will be placed 50% from the leading edge of the segment. No more than two missiles per segment aimpoint. The maximum number of segments is eight (8).

When entering a target, describe the length as that portion of the target that is parallel to the direction of movement. The result could be a length that is shorter than the width.

IMPORTANT!!

If you are the "observer" for an ATACMS mission, make sure coordination (if necessary) is complete prior to firing the mission. If you had sent (rather than processed) the Fire Request from your OPFAC, always check with the OPFAC to which you sent the Fire Request to make sure they have completed coordination of the mission. As a matter of procedure it is better to "OK" rather than "Send" from the IFM form.

C. Attack Analysis for ATACMS BAT. Once the target is segmented (if necessary), AFATDS determines the volume of fire (number of missiles) required for the mission. This is based on the observer specified quantity or, if no quantity is requested, the number of missiles required to achieve the desired effects. Once the analysis is complete, AFATDS will assign a "Go" / No-Go" rating for each child target (if any) and the original target as well. Targets may be rated "No-Go" when the following conditions exist:

- Effects cutoff guidance (in FS munition restrictions guidance) violated.
- Effects could not be achieved.
- Too many missiles required (a maximum of 2 per child target are allowed).
- Cloud height too low.

AFATDS is capable of assigning an additional child target(s) to a fire unit when the number of available missiles is equal to or greater than the number of missiles required for the assigned child target(s).

Example: A target has been segmented into 4 child targets – each requiring 2 missiles. Fire Unit “A” has 3 operational launchers and 4 uploaded ATACMS BAT missiles. Fire unit “A” may be tasked to fire two of the child targets (4 missiles are used on 2 segments). If fire unit “A” had 3 launchers and only 3 ATACMS BAT missiles, then it would be assigned on one child target (2 missiles).

D. ATACMS BAT Mission Data. AFATDS will also determine the required ABAT mission data for employment of the selected munitions. This data will include the following element(s).

- Attack mode (direct/indirect).
- Target countermeasures.
- Target Environment.
- Target Elements.
- Submunition dispense (aim-point) location (sent as offset data) for each rocket/missile.

AFATDS under normal mission processing generates a time on target (TOT) mission whenever moving target information is provided with the target description. AFATDS determines an “intercept point” based on speed, direction, and current location. This is determined using the targets current location, speed, and direction of the target five minutes into the future (target report time +5 minutes). This creates a problem for ATACMS BAT missions, because the speed and direction information is used to determine BAT mission critical data that is used to program the missile warhead.

Engaging the target with ATACMS BAT is normally conducted with a method of control of “at my command.” When target actually presents itself at an aimpoint that has been preplanned, then target is attacked. In the case of ATACMS BAT missions with a method of control of “Warning Order”, the “intercept point” solution for moving targets is “bypassed” by the AFATDS system software and the “at my command” method of control will be used to attack the target.

The AFATDS OPFAC controlling an “At My Command” ATACMS BAT mission can issue a single fire command that will cause the child targets (segments) of a given parent target (original target) that are in a ready status to be fired.

1. When an ATACMS BAT mission with multiple segments is initiated, the “Mission Toolbar” count will increment by one upon receipt of the first “Ready” status received for any “Child Target” associated with a “Parent Target.”
2. Once the “Parent Target” is indicated as “Ready” in the “Mission Toolbar”, receipt of a “Ready” messages for other “Child Targets” associated with a “Parent Target” for an ATACMS BAT fire mission will not increment in the “Mission Toolbar”.
3. The operator may then select “Fire” from the “Commands” window for the ATACMS BAT mission, AFATDS will issue a “Fire” command message for all “Child Targets” associated with the “Parent Target” that are in a “Ready” status.
4. AFATDS will then issue an “End of Mission” message for all “Child Targets” associated with the “Parent Target” that are not in a “Ready” status when the “Fire” command message is issued.
5. AFATDS does not issue any commands to the “Parent Target.”

IMPORTANT!!

Check firing a segmented parent target will not check fire the child targets. To check fire child targets requires check firing them individually. Child targets are check fired when a check fire all is received.

Additional Information when firing Multi-Segmented Targets with a Single Fire Command.

- The “Fire, WR” button on the “Parent Target” Basic Information Target (BTI) window and the “Fire” button on the “Commands” window will be enabled upon receipt of a “Ready” status message of any associated “Child Target” and all coordination is complete.

- The “Fire, WR” button on the “Parent Target” (BTI) window and the “Fire” button on the “Commands” will be color-coded yellow until receipt of a “Ready” status for all associated “Child Targets.”
- The “Fire, WR” button on the “Parent Target” (BTI) window and the “Fire” button on the “Commands” window will be color-coded red when all “Child Targets” associated with a “Parent Target” are in a “Ready” status.
- For a “Parent Target” in a “Ready” status, AFATDS will send an amended Call For Fire (CFF) message to all destination units assigned to fire associated “Child Targets” upon operator selection of the “Fire, WR” button on the BTI window, or a “Fire” message to the destination units upon operator selection of the “Fire” button on the “Commands” window.
- AFATDS will send an End of Mission (EOM) message to all “Child Targets” associated with a “Parent Target” that are not in a “Ready” status upon operator selection of “Fire, WR” button BTI window or the “Fire” button on the “Commands” window.
- The number of “Child Targets” associated with a “Parent Target” and the number of “Child Targets” in “Ready” status will be indicated on the “Commands” window and the on the BTI window.
- At the Intervention Point (on the “mission information” window), if necessary the operator can override the status of a “NoGo” “Parent Target” for an ATACMS mission and change the status to “Go” when the “Child Targets” contain a mix of “Go” and “NoGo” status.
- “Child Targets” with a “Go” status will be transmitted to the appropriate units when the AFATDS operator changes the status of a “NoGo” “Parent Target” to “Go.”
- AFATDS will end all missions associated with “Child Targets” in a “NoGo” status when the “Parent Target” is changed from “NoGo” to “Go.”
- AFATDS will update the “Parent Target” record to show only the “Child Targets” transmitted when the “Parent” status is changed to “Go.”
- The “Ready” status of “Child Targets” will be consolidated on a single window for review by the AFATDS operator.

E. ATACMS APAM. AFATDS analyzes APAM in a similar fashion to MLRS-DPICM analysis. Large area targets may be segmented (but instead of "children" targets being created, AFATDS will produce an aimpoint for each segment). The maximum target size for ATACMS APAM is 2000 X 2000 meters. "Go" / "No-Go" assessments are not performed like ATACMS BAT. Instead, if the target can be attacked based on available units and munitions, AFATDS will mark the attack option as capable.

F. <u>EFOGM</u>. EFOGM is handled similar to ATACMS BAT. Child targets may be developed and Go/No-Go ratings assigned. EFOGM targets are segmented as follows.

1. EFOGM targets will require segmentation when the length of the target exceeds 4,000 meters. The target will be divided in to equal segments of 4,000 meters or less. The maximum number of segments will be twelve (12).

2. If the target width of an EFOGM target exceeds 1,000 meters, the target will be segmented until all segments are less than or equal to 1,000 meters. The maximum number of segments will be twelve (12).

3. If the target strength exceeds twenty-four (24) target elements. The target will be segmented until the strength of each segment is less than or equal to 24 target elements. The maximum number of segments will be twelve (12).

4. If the volume of fire (VOF) for any target segment exceeds 32 missiles, the target segment VOF will be set to 32 missiles. If the VOF exceeds 32 missiles for any target segment, mission will be NO GO – “Too Many Rounds Requested.”

G. <u>Munition Calculator Support For ATACMS BAT</u>. With the Loadable Munition Module for ATACMS BAT activated the operator can use the Munition Calculator to perform fire mission capability analysis on suitable targets.
To perform the analysis, the operator should first establish the target. The operator will access the Munition Calculator from the Mission Processing menu of the Current Situation. If the operator is using an established target it is only necessary to type the target number into the target number field of the munition calculator window.

When ATACMS BAT is selected for analysis with the Munition Calculator. The operator has the ability to calculate the quantity of rounds required to attack the target for a desired effects level. The operator can then determine the percentage of coverage on the target being analyzed. After determining coverage, the attacking fire units can be selected and the PAH and TAH for the target can be generated and displayed. The time of flight is also displayed as a non-editable value. The operator than has the ability to store the parent target with its sub-targets.

H. <u>Munition Calculator Support For Army-TACMS (APAM)</u>. With the Loadable Munition modules for Army-TACMS (APAM) Block I and IA activated the operator can use the Munition Calculator to perform fire mission capability analysis on targets that are suitable for attack with APAM.

> **NOTE!**
>
> **APAM is generally used to attack soft targets such as C2 Centers, Logistics Sites, FARP, Helicopter Staging Areas and other non-hardened type targets.**

To perform the analysis the operator will need to establish a target in the same manner he used for Army-TACMS (BAT) targets. The operator can then select the Munition Calculator from the Mission Processing menu and enter the target number for the target on which he will perform attack analysis.

While performing analysis for APAM targets, the operator has the additional capability of changing the dispersal pattern for the target. There are three selection for dispersal patterns available to the operator for the analysis of APAM targets. These patterns are designated as A, B, C. The default pattern for APAM is dispersal pattern C. The PAH and TAH information and missile time of flight (TOF) are also displayed as part of the solution.

I. <u>Planning & Executing ATACMS Missions</u>.

Effective employment of ATACMS munitions on moving enemy targets requires careful planning and coordination by Fire Support personnel. The basic idea with preplanning these missions is to perform the following:

- Determine where (Engagement Point) you want to attack the enemy unit(s) based on probable enemy courses of action. This requires coordination with maneuver, intelligence, and supporting air components. Depending on the situation, you may wish to plan more than one engagement point based on the probable courses of action the enemy may take.

- Determine the solution for attacking the target at the Engagement Point. In this step you want to determine:

  - Which MLRS unit(s) will fire & where you want them to fire from (firing location).
  - How many missiles will be fired by each unit.
  - What the PAH/TAH and Missile Flight Path look like (including the time of flight from firing location to target).

- Create Posture instructions to support your decision about Which MLRS unit(s) will fire & from where you want them to fire. The idea here is to get the posture instructions created so you can send them when necessary.

- Determine how and where you want to track the enemy unit(s) up to each engagement point. For example, using Named Areas of Interest (NAI) along the probable travel routes from where the enemy is now - to the location of the engagement point. In this step you want to place the NAIs in areas that will:

  - Track the enemy's movement decision (e.g. after a "fork" in the road).
  - Track the enemy's movement progress (e.g. 30K from engagement point)
  - Track the enemy's movement into an area that tells you to fire the missiles (this is based on missile time of flight and projected enemy movement speed) so that they arrive at the engagement point at the same time as the enemy unit(s).

- Determine who (what sensor) will track the enemy unit(s) you are interested in attacking. Create and send initial sensor tasking orders to specify the target criteria to the sensor(s). Create (and save) additional sensor orders for later transmission. These additional orders refine the sensor's criteria (e.g. search area) based enemy unit movement.

- Set up trigger events associated with each of the NAIs so you can track the enemy's actions. These triggers will trip as the enemy enters the NAIs. For example, the first tripped trigger tells you that the enemy has committed to a specific movement route. The actions to take at that time would include sending the posture instructions to the units you planned to attack the target.

The steps below will focus on the procedure and sequence to plan and execute the ATACMS mission on an enemy unit.

- Make sure you have specified a target number block.

- <u>Enter the target data.</u> Open the <u>On-Call</u> target list and create a target at the location where you wish to engage the enemy unit. Include, as a minimum, the location (including altitude), a target type, strength and size. For ATACMS-BAT targets make sure you put in a "target activity" of "moving" (this is because ATACMS BAT can only be effectively used on moving targets). If you know the "target

Formation" (on road, off road or dispersed), enter that as well. The target type should correspond to the predominant target type of the enemy unit (e.g. "Armored Vehicle"). If the known composition (BMPs, BRDM etc.) of the column can be forecasted, enter the specific target elements and the anticipated strength of each element on the "More Target Info" window.

IMPORTANT!!

Do not select target location based on the map backgrounds displays (remember – the map backgrounds are not accurate enough for determination of targeting data). Target location should be coordinated with intelligence and operations personnel using accurate map data such as a paper or digitized map.

- Analyze the target. Open the munition calculator and type in the target number for the target you created earlier – tab out of the field (AFATDS will retrieve the target data for you and place it on the window).

  - Select the FS System (Rocket/Missile) then select the munition type (ATACMS BAT, ATACMS APAM etc.). No other entries are required.

  - Select the "Next" button.

  - On the ATACMS BAT window, selected target information will be displayed. If this is the first time you have analyzed this particular target, the bottom section of the window will be blank. Otherwise the results of your most recent analysis will be displayed.

  - To conduct an analysis to determine the number of missiles ("Total Qty") required to achieve a specific "effects desired", select the "Calculate Qty" button. This will segment the target (if necessary). The bottom of the window will now be filled out with a row for each target segment. Each row will tell you the coverage achieved on the segment, the quantity to be fired on that segment (this will always be 1 or 2 missiles), a "go"/"NoGo" status and a "NoGo" reason (if applicable). If the number of missiles or number of segments is too large, you may reduce the "effects desired" value and try again

- To conduct an analysis to determine the expected effects ("effects desired") achieved by a specified number of missiles, select the "Calculate Coverage" button. When you enter the quantity of missiles, AFATDS will divide the total among the required target segments (remember, a segment may be assigned a maximum of two missiles). For example, if the target requires two segments (due to target strength or size) and you enter 4 missiles, each segment will be assigned two missiles. Had you entered 6 missiles, AFATDS would segment the target into 3 segments. If the number of missiles or number of segments is too large, you may reduce the "Total Qty" value and try again.

- Once you are satisfied with the segmentation & volume of fire, you may enter a desired fire unit ID or firing point location for each segment. If you want the mission fired from a specific location enter the firing location (not the fire unit). If you enter the fire unit (but not the firing point), that fire unit's current location will be used to run the analysis.

- Select the "Calculate PAH/TAH" button. This will compute the PAH, TAH and missile flight path (MFP) for each segment – each segment will also be assigned a target number at this time. The PAH, TAH and MFP will be displayed on your map. You may change firing points and perform this step again if desired.

- Once you are satisfied with the PAH, TAH & MFP locations – enter a fire unit ID for each segment. Select the "Store" button (this will close the window and save the target segments (now called "child targets" of the original "parent target").

• <u>Pre-coordinate Mission</u>. You may "push" the PAH/TAH and MFP geometries to the AFATDS unit responsible for clearing ATACMS missions with the supporting air components. This will simply provide that OPFAC with a graphic of what these geometries look like – If that OPFAC desires that you reanalyze or alter the mission, he should send you a PTM containing these instructions. This is a manual process (i.e. PTM) at this time since an active mission has not yet been initiated.

• <u>Create Posture Instructions.</u> Select the MLRS fire unit(s) that you assigned to each segment and then select "Posture". Create a new posture and when the window opens, type the target number into the target number field and tab out. The firing location used in the munition calculator will be automatically placed in the posture instruction. The volume of fire (1 or 2 missiles) will also be placed in the munitions to be uploaded portion of the instructions in the "greater than 20 min" column. It is recommended that you move the quantity from the greater than 20 minute column to the 2 minute quantity. OK the form (do not send).

- Create NAIs. Begin creating the NAIs to manage the mission along the projected route you expect the enemy unit to travel. Use the "General Geometry" type and name each NAI using "NAI 12", NAI 13" etc. At a minimum you should create an NAI for each of the following:

  - To trigger you to send posture instructions to the fire unit(s). This will be the NAI farthest from the target location-engagement point. It should be located at a distance away from the target such that the fire unit has time to move to the postured location prior to the arrival of the enemy unit at the next NAI.

  - To trigger initiation of the preplanned mission. This NAI should be located at a distance away from the target such that you have time to perform final coordination of the PAH, TAH and MFP geometries as well as any FSCM or Clearance of fire requirements prior to the enemy arrival at the target location.

  - To trigger the "fire" command for the mission. This NAI should be located at a distance from the target based on the missile time of flight (ToF) and the enemy units movement speed. Note: You can get the ToF for the missile by viewing the data for the MFP geometry. For example, if the time of flight is 4 minutes and the enemy is expected to be moving at 30 Kph (that's 0.5 kilometers – or 500 meters per minute), then the NAI should be placed 2 kilometers from the target (500 meters x 4 min = 2,000 meters). The formula is:

    NAI Distance = Speed of enemy unit (in meters/min) x ToF (in minutes)

IMPORTANT!!

Use area geometries for tracking the enemy units. This is because when you associate the NAIs with trigger events you will not get "false trips". If you use a line geometry to track the enemy (e.g. trigger rule is "Target Type: Armored Veh forward of PL Ace"), it will trip immediately when set since your preplanned target is already forward of PL Ace.

- Create Sensor Orders. Now that you know where the NAIs are – create orders for your supporting sensors. For example, if JSTARS is available, use the "ATI.TCRIT" message format (for PK 10 JSTARS this is under the "Messages" → "New" Select "ATI.TCRIT" then "JSTARS". Fill out the message specifying search areas and target type. If the enemy is an armored vehicle column, you would select "Armored Vehicle". The initial sensor tasking may be sent immediately. Create and save (don't send) additional sensor orders (if necessary) to be used based on enemy movement. If the sensor has no problem scanning the entire area of interest, this may not be necessary – otherwise you will need to create additional sensor orders (for example to have the sensor monitor NAIs along the route up to the target.

IMPORTANT!!

Tell the JSTARS to use the "ATI format" (you don't want fire missions initiated on the JSTARS target data at this time). Do not place the target type that JSTARS is reporting (e.g. armored vehicle) on your HPT list – this may result in fire missions being automatically initiated against the ATIs reported by JSTARS.

- Create Trigger Events. Create a trigger event for each NAI. The trigger should be based on a target type corresponding to the type of target the sensor will be reporting (e.g. Armor Vehicle). For example, Trigger Rule is: Target type Armored Veh reported in NAI 12. Using the Figure 37 as an example, triggers would include:

Rule: Armored Veh reported in NAI 3
Action: Send Posture # 03 to 1 FDS A/63 FA

Text: "Send modified ATI.TCRIT to JSTARS"

Rule: Armored Veh reported in NAI 4
Action: Initiate Fire mission on target AA1000 (this is the parent target) Note: remember, this will initiate a "Warning Order" mission ("At My Command")
Text: "Make sure fire unit is in position (has postured IAW directives)"

Rule: Armored Veh reported in NAI 5
Action: none
Text: "Fire Target AA1000"

IMPORTANT!!

If you require clearance from air components for the PAH & TAH geometries, you should set up your data distribution to distribute "This Units" "PAH/TAH/MFP" geometries to the OPFAC responsible for clearing ATACMS missions. This OPFAC should also be the owner of the FSCL or entered in the clearance of fires rule set.

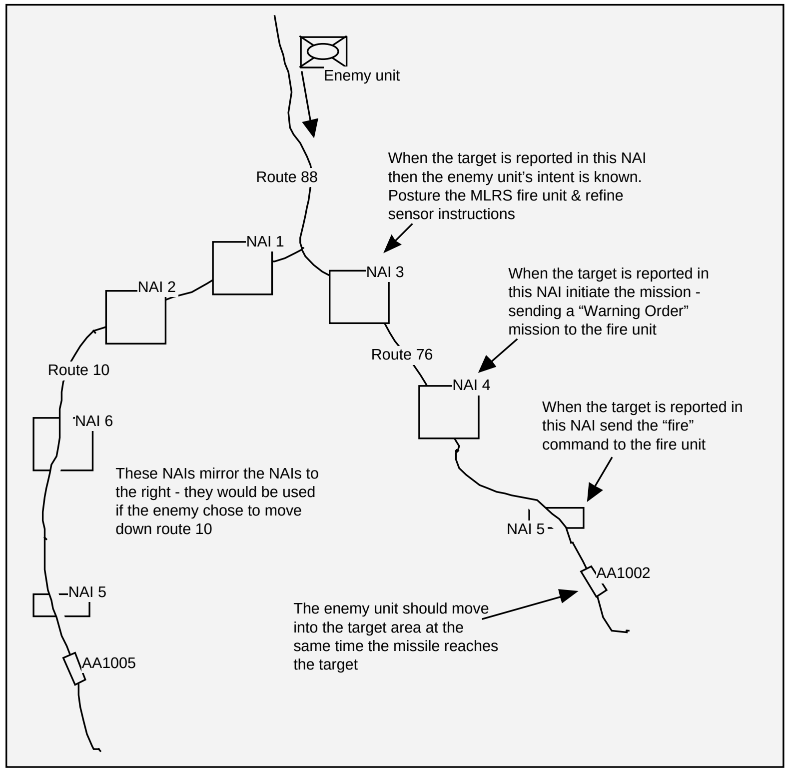


Figure 37. Example of Preplanning an ATACMS Mission

- <u>Monitor Situation.</u> As the JSTARS reports targets, they will appear on the map. When they are reported in the NAIs they will trip the triggers – you now must simply take the actions that were preplanned.

J. ATACMS-Precision Surface Attack Missile (ATACMS-PSAM).

The ATACMS – Precision Surface Attack Missile is a unitary warhead missile designed to attack point targets at ranges from 70 to 300 kilometers. The warhead is attached to the same missile assembly used by the ATACMS APAM Block IA and uses the Global Positioning System to improve terminal accuracy. The target should be located with a sensor that has a target location error (TLE) of 100 meters or less. The operator must insure that the Loadable Munition Module (LMM) for ATACMS-HE is activated. To select this munition the operator will select ATACMS-HE as the FFE1 munition. The J-Code for the PSAM is JEJ. The default quantity of missiles to be fired will be one (1).

Segmentation of the target is not conducted with this munition since it is intended to attack point targets. The delivery system for the ATACMS – PSAM is the M270 with the Improved Position Determinant System (IPDS) or M270A1 launcher. The “small” or “A” dispersal pattern should be selected with this missile. The PAH, TAH, and MFP for this missile will be displayed in a manner similar to that of the ATACMS-APAM missile.

Mission processing is conducted as a warning order with the same procedures as the ATACMS-APAM missile, with the exception that the munition calculator is not utilized.

Tactical Fire Control for MLRS Units
Battalion, Battery, and Platoon Level

A. MLRS Units.

1. Unit Configuration. Prior to activation of the AFATDS software, the unit role for the battery or platoon FDC is set to FA CP. Each SPLL is represented as a separate fire unit controlled by the FDC. AFATDS views this relationship much in the same manner as a cannon battalion FDC controlling multiple fire units.

2. Unit data. MLRS units are setup in a similar manner to Paladin cannon units.

   a. Platoon FDC. The platoon FDC is established as an other type unit with a unit symbol of command post.

   b. MLRS SPLLs. Each SPLL is established as a separate unit. The weapon is constructed in the database as an MLRS type unit with a unit symbol of unit and an echelon of section. A single launcher (weapon # 1) is added to the Weapons folder of the unit.

   c. Master unit list. Each SPLL of the MLRS unit must be established in the AFATDS Master Unit List. The device type Army FCS must be selected.

3. Communications. AFATDS employs the 11508910/02 protocol to communicate with M270 MLRS launchers. To establish the net, the following steps are performed.

   a. Establish the FCS Net.

      1). Click System. Configuration, Communications, Current to display the Current Network window.

      2). Click Network, New to display the Net Channel Settings window. This is the same window format is used to establish non-IP networks.

a). Network Name. This is the text name assigned to the network.

b). Protocol. Click the field to display a list of AFATDS supported protocols. Click FCS from the list. The window updates with default values.

c). The remainder of the data fields are identical to those used on any TACFIRE network except that the local address requires a two digit entry.

d). The More button access the FCS Settings window. Block mode can be selected as well as the Device. Device defines the type of unit, allowing selections of FDC (battery FDC) or PL1 to PL4 (for the platoon FDCs.

b. Destination units. Each MLRS launcher must be added to the communications configuration and assigned to the FCS net.

B. MLRS Mission Processing.

1. As described above, the MLRS unit FDC is established in the AFATDS database as an FACP. As a result, AFATDS processes missions for the MLRS unit in the same manner as for any FACP. This process is described in detail in Appendix F, The Mechanics of Fire Mission Processing. In addition, the following apply.

a. When posture is assigned to an MLRS fire unit, the ammunition associated with the posture is considered allocated and will not be available for other mission processing.

b. If a fire mission is assigned to the MLRS unit and has not been completed, the ammunition assigned for firing the mission is not considered available for other missions received and processed at AFATDS after the assignment of the first mission.

2. Because MLRS launchers must be directed to firing points, ammunition re-supply points, etc., AFATDS incorporates logic to manage point assignments at the MLRS FDC.

3. Selection of a launcher's firing point for a mission is based on the following:

a. If there is no firing point assigned, AFATDS will direct the launcher to fire from its current location until point data for the launcher is entered.

b. If there is only one firing point assigned, that point is used.

c. If there are multiple firing points associated with the launcher a number of things can occur. These events depend on guidance, missions currently assigned and firing point history in terms of usage. Generally speaking, AFATDS will automatically direct the launcher to fire from each assigned firing point in turn.

1) If the Rocket/Missile Guidance Multiple Missions check box is not enabled, and a launcher has more than one firing point assigned, AFATDS will not direct a launcher to shoot sequential missions from the same firing point.

2). If the Rocket/Missile Guidance Multiple Missions check box is enabled this logic is modified. AFATDS examines current system time, the dwell time guidance, the active missions currently assigned to the launcher, the estimated time to complete those active missions, and the estimated ammo remaining on board when active missions have been fired. If AFATDS determines that the launcher will have sufficient munitions on board and will not have violated dwell time guidance with the time already spent on the current firing point, it will direct the launcher to fire the new mission from the current firing point. If these conditions cannot be met, AFATDS will direct the launcher to its next firing point. Selection of the NEXT POINT to assign the launcher after the mission as follows :

a). If reload is required:

1). And a reload point is assigned to the launcher, this reload point is entered in the MLRS;CFF as the next point.

2). Or, if the launcher has no assigned reload point but the unit that directly commands the launcher does, AFATDS assigns the reload point associated with the command unit as the next point.

3). Or, if neither the launcher nor its commanding unit have an assigned reload point, the next point is left blank in the MLRS;CFF and the operator is alerted that the unit requires reload and no reload point is available.

b). If reload is not required:

1). AFATDS directs the launcher to the hide point associated with its next firing point.

2). If the next available firing point does not have an associates hide point, AFATDS sends the launcher to the next firing point.

4. Update Unit and Point data after the transmission of a fire order. When a point is assigned in a fire order (MLRS;CFF) a number of events occur.

a. The usage history of the point is incremented by 1.

b. If the usage threshold for the point is met or exceeded, an alert is provided to the operator. It should be noted that AFATDS will continue to use the point. It is up to the operator to delete the point or the launcher's association with the point.

5. Survey Control Points**.** Survey control points (SCPs), unlike other point associated with MLRS units, do not possess a point alias in AFATDS. To allow SCPs to be transferred to a SPLL, the SCP name must begin with a letter A, B or C. The letter must be followed by a number 1 through 9. Additional characters may be added to the name. However, when the SCP is transmitted to the SPLL, the SCP name is abbreviated to only the first two characters.

C. Windows Associated with MLRS Mission Processing.

1. Intervention window, Rkt/Msl Soln tab**.** The Intervention form differs at an MLRS unit from that displayed at CPs and FSE/FSCCs in that the Rkt/Msl Soln tab is activated. Selecting the Rkt/Msl Soln tab displays data computed for the mission. This data is displayed in the following format.

a. Tgt Number field displays target number associated with the mission.

b. Location field displays the center location of the reported target.

c. Unit ID displays the ID of a launcher assigned to the mission and highlighted on the Intervention tab.

d. Attack Option indicates, by a number, which of the attack options from the Intervention tab is displayed.

e. Aimpoint is the aimpoint for the displayed launcher.

f. Munition Model displays the nomenclature of the rocket to fire.

g. Munition Type is the type of rocket expressed as a “J” code.

h. QTY displays the number of rockets to fire.

i. MOC is the method of control assigned for the mission.

j. DP is the dispersal pattern indicated by a letter and is only displayed for missile missions.

k. NET/TOT contains the “Not Earlier Than” time or the “Time on Target” time for these type missions. Otherwise, this column is blank.

l. NLT indicates the “Not Later Than” time.

m. Firing Point indicates the firing point assigned to the launcher for this mission. If the column is blank, no firing point is assigned.

n. TOF displays the time of flight for the launcher in this mission. (ATACMS missions only.)

o. Aimpoint # is provided for multiple aimpoint missions. Each aimpoint is sequentially numbered.

p. Easting Shift is the change in easting from the target center easting to the aimpoint easting coordinate.

q. Northing Shift is the change in northing from the target center northing to the aimpoint northing coordinate.

r. Altitude is altitude of the aimpoint.

s. # Rounds displays the quantity of rockets to fire at the aimpoint.

2. Intervention window, Missile Information tab**.** The Missile Information tab is activated at MLRS fire units for ATACMS missions. Selecting the Missile Information tab displays Go/No Go data for the mission and any associated subtargets that resulted from segmentation. This data is displayed in the following format.

a. Tgt Number field displays target number associated with the mission.

b. Unit ID displays the ID of a launcher assigned to the mission and highlighted on the Intervention tab.

c. Go/NoGo indicates whether the target can be successfully engaged using the missile for which the mission was computed. This status is based on LMM computations.

d. No Go Reason field is populated with a statement indicating why a capable option could not be determined when the mission has a No Go status.

e. Subtarget data is displayed for each segment of the target. As with the mission overall, a Go/No Go status and reason filed is provided for each segment.

WARNING!
If your OPFAC is managing MLRS launchers and you want to use a different solution then the AFATDS recommendation, - you must "Recalculate" the mission (optionally specifying the specific howitzer(s) or Launchers that you want to use). Do not use the "Send" option. This will ensure that AFATDS can correctly determine ballistic solutions and perform trajectory related checks (Air space near & downrange masks).

WARNING!
If your OPFAC is managing MLRS launchers and multiple fire missions have accumulated in the IP - you should "Recalculate" each mission before accepting the recommendation. This will ensure that AFATDS uses the latest mission (current mission assignments at the weapons) and unit data.

3. FCS Weapon Status icon on the current window tool bar. The FCS Weapon Status window is accessed from the FSC Weapon Status icon found on the Current window tool bar. This window maintains a constant status for all weapons and all missions.

a. The upper display of the Weapon Status FCS window provides the status of all launchers:

1). Unit ID is the first three characters of the launcher name (AFATDS UNIT ID in the MUL) with a slash between each character.

2). The Wpn Model as well as OP Status, are determined from the launcher's weapon data in the unit's detailed unit information.

3). Uploaded munitions are displayed with their quantities in the Mun Model. Mun Type, Mun Qty.

4). Pri Msn displays the target number of the priority mission, if assigned. Weapons with priority missions will be displayed at the top of those listed.

5). The launcher's point location and the point's ID are provided.

b. The lower display of the Weapon Status FCS window provides the status of all missions by launcher. The mission information is displayed when a launcher listed in the upper display is selected by clicking that launcher's row of data.

1). Target is a list of active missions.

2). The mission's method of control is displayed in the MOC column.

3). Status provides the current mission status as Firing, Ready, CKFire, Sent (mission transmitted and awaiting FCS reply), Not Sent.

(4). # Rnds indicates the number of rockets or missiles assigned to the mission.

(5). Next Point Type and Next Point ID display the identity and type of the next point or position to which the launcher is directed to move after completing this mission.

Data Distribution

Data distribution is the mechanism by which AFATDS ensures that information is the same between many different OPFACs. This allows units which process fire missions to have correct data about subordinate units and allows CONOPS backup units to have necessary data if they need to go into a CONOPS mode. Two major parts make up data distribution: distribution lists and distribution criteria.

A. Distribution Lists. A distribution list is a group of units which you can select to transmit information to. When sending information about units, geometries, etc., either a destination unit or a destination distribution list can be selected. AFATDS has seven (7) default distribution lists:

- Higher HQ -- from the Command HQ entered on your Unit Information
- JMCIS-- from the JMCIS entered on your Unit Information
- Primary CONOPS -- from the Primary CONOPS entered on your Unit Information
- Secondary CONOPS -- from the Secondary CONOPS entered on your Unit Information
- Subordinates -- all units who have you as their Command HQ
- Supported Units -- from the Supported HQ entered on your Unit Information
- Supporting Units -- all units who have you as their Supported HQ

These seven (7) lists are not editable except by changing data on the Unit Information window for you or your subordinates. Only lists created by you, the operator, can be edited.

To Create a Distribution List

1. Select "System | Distribution | Lists".
2. The Select Distribution List window will open.
3. Select "Options | New...".
4. The "Edit Distribution List" window will open. Two lists are shown; the bottom list is the one you are creating; the top list gives you available units for your list. To add units to the list, select units in the upper box and click the down arrow. To add a list of units to your list, select the "Lists" button, select a list and click the down arrow. To remove units from your list, select the unit(s) and click Remove.
5. Enter a name for your new list and click OK. Click Cancel to abort the new list.

To Edit an Operator Created Distribution List

1. Select "System | Distribution | Lists".
2. The Select Distribution List window will open.
3. Select a list to edit and select "Options | Edit".
4. The "Edit Distribution List" window will open. Two lists are shown; the bottom list is the one you are creating; the top list gives you available units for your list. To add units to the list, select units in the upper box and click the down arrow. To add a list of units to your list, select the "Lists" button, select a list and click the down arrow. To remove units from your list, select the unit(s) and click Remove.
5. Click OK to save. Click Cancel to abort.

B. Distribution Criteria. The distribution criteria allows you to specify when and if certain information is automatically relayed to what distribution list of units. For each category of information (for example units, geometries, etc.), information can be automatically relayed if any change occurs, if a critical threshold percentage is reached or can be set to none so no relay of information is done.

For relayable Geometry Data, the criteria is set based on the unit that established the geometry, and for relayable Unit Data, the criteria is set based on the unit that the data is about. It can be set for your own data (This Unit), your command HQ's data (Higher), your subordinates data and Other unit's data (all other units which are not you, your higher or your subordinates). The following table shows the information which is relayable.

Table 17. Not all AFATDS Data is Relayed Automatically

Relayed Information	Information not Automatically Relayed
Current Geometries	Planned Geometries
All Friendly Units	All Guidance
All Enemy Units	Target Lists, Series, Groups
MET*	Fire Plans, Schedules
	Whole Plans

* MET data is relayed based on the MET Unit ID's entered in the General Unit Information window.

IMPORTANT!!

Information never automatically originates from an OPFAC but instead is automatically relayed. That is, when someone sends you an information update, based on your distribution criteria you will "relay" it on to another set of OPFACs automatically. But if you change a piece of data, it will not be sent out of your OPFAC unless you choose to do so.

IMPORTANT!!

Guidance is never relayed automatically but is always manually sent by the operator. This is because when guidance is received at an OPFAC, it goes into a holding area in "Situations | Received Plans/Current Guidance" to be previewed by the operator before saving or forwarding to other OPFACs.

To Set Up Distribution Criteria. To set up distribution criteria, it is helpful to first determine the rules you will establish and create the necessary distribution lists.

a. Select "System | Distribution | Criteria" to open the "Distribution Criteria" window.
b. For all establishing units in all categories, select distribution lists for the subcategories to whom information is auto-relayed to as well as the trigger which determines whether or not to auto-relay the information.

C. Distribution of Summary Data. Data distribution selections include summary information. The Distribution Criteria window lists them as : "Ammunition Summary", "Weapons Summary", and "Equipment Summary". The "Send Status" window list them as "Ammo Summary", "Weapons Summary", and "Equipment.

When AFATDS sends summary information (either due to automatic data distribution or due to operator "push"), AFATDS provides some special behavior: If the destination unit for the summary data is the OPFAC that backs up your OPFAC (i.e., your primary or secondary CONOPS unit), AFATDS will not send summary data to that unit. The reason this happens is because your CONOPS unit does not need your summary data since it will calculate a summary (by "rolling-up" data maintained for your subordinates in his database) for your OPFAC anytime the operator views or sends your unit data. The backup does this calculation since he will be using fire unit data (as it exists in his database) for your subordinates when a CONOPS situation requires him to take over. The calculated roll-up allows the backup unit to "see" the summary of what is in his database about your unit.

Your backup unit should be receiving all of your subordinate's unit updates thorough automatic data distribution. Make sure you set up the distribution criteria to let this happen.

IMPORTANT!!
If you are an FA CP, make sure you set your distribution criteria to send "This Units" basic unit data, detailed unit data, ammunition summary, and weapon summary to your command and supported units. This is necessary so they can perform unit level attack analysis on your unit.

Planning for Fire Support Overview

Plans and orders usually reflect the results of a problem solving process in which various alternatives are considered and the most viable selected. The plan is a means to coordinate and synchronize efforts so mission objectives can be achieved with the resources and time available. Plans are prepared in advance of an operation while Orders are used to execute the plan, respond to unforeseen events, and keep the plan on track.

FM 101-5 (or Current doctrine) describes five categories of Plans, two categories of Orders and five types of Combat Orders. Although AFATDS can practically support any of these, its tools are focused on supporting Five-Paragraph Operational Plans, Combat Orders, and Operations Orders used in the planning and execution of Fire Support. Planning can also be a collective iterative effort during which draft plans are disseminated, feedback evaluated and incorporated, decisions made and final plans distributed for execution. AFATDS provides tools supporting the decision process, documentation, distribution, and implementation of plans or orders.

In AFATDS, planning starts with the evaluation and selection of a maneuver Course Of Action (COA). Each Plan can have up to 99 Phases, by default every Plan will have at least one Phase. Each Phase can have up to three COA's, though none are required or provided by default. Each COA may contain its own guidance and unit task organization (e.g., differing FS & FA Attack Methods, org for combat, Target Guidance, etc.).

Before the draft Plan can be sent to subordinates for feedback, one COA must be selected for each Phase that has one or more associated COA's. AFATDS provides a method - based on rounds-expended, simplicity, supportable tasks, etc. - to compare COA's. This COA-selection decision aid employs common planning assumptions, such as unlimited ammunition, a constant unit location for the Phase, etc., that provides a common basis for comparison. See Figure 43.

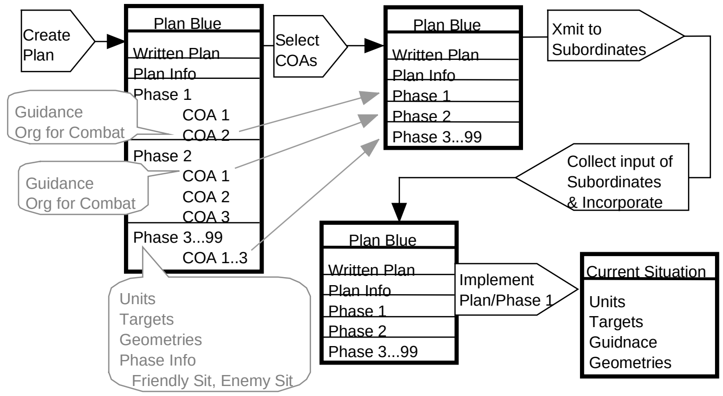


Figure 43. Current and Planning Components.

Each Phase can contain units, geometries, guidances, etc. that make it unique. When a Phase is implemented, the contents specified in the Phase (Units, etc.) replace the existing contents (Units, etc.) in the Current Situation. A Phase is a collection of planned adjustments to the Current Situation and a Plan is a collection of Phases. In effect, the Current Situation is the Phase that is currently being executed within a Plan. Your SOP, for example, could be thought of as a single-Phase Plan that you execute absent other formal Plans. Changes to the Current Situation can be thought of as unplanned adjustments that happen during execution of a Phase.

After selecting a COA for each Phase, the draft Plan can optionally be the final Plan or be sent to subordinates for their input. AFATDS makes no formal distinction between a draft or final Plan. The subordinate may develop Annexes, comment on those provided or develop their own supporting Plan. If a subordinate changes or comments on the original written portion of the Plan, it is important they rename the document (Annex, Appendix, Tab) so it does not overwrite the original upon return. Some inputs, e.g. Targets, can be merged when the input is received, others require review and acceptance or modification. Once all inputs are collected and incorporated, the final Plan can be distributed.

This written plan may be edited at any time during and after the planning cycle. It is used to provide greater detail, clarification and justification to the decisions made in the planning process and to record this information for others. The construction of a written plan is simplified by the ability to copy large sections from previously established written plans and then edit the plan, or by the ability to "insert" AFATDS guidance or estimate results into the plan in written form so that it can then be edited and tailored for your use. AFATDS written plans may also be distributed for comments or additions. Care should be taken when returning changes to the originator as receipt of an exact title match will overwrite the original document. Upon receipt of comments, the original OPFAC can then use the editing tools to copy or paste portions of text from the various responses into the original document.

Planning for Fire Support
Plans and Phases

By default, a plan must contain at least one phase. When initially created, a plan contains phase 1 automatically. When the last remaining phase of a plan is deleted, the plan itself is deleted. Further, a phase can only be deleted from a plan if it is the last phase of that plan. A phase cannot be deleted right out from the middle of two other phases.

A plan has certain Plan Information which is not contained in any phase of the plan. This information includes the plan name, the establishing HQ of the plan, the H-Hour time (used to compute the start times for H-hour related geometries and targets), and other items used in the written plan such as the security classification of the plan, the plan's time zone, etc.

When creating a phase of a plan, whether it is the first phase, or any subsequent phase, you will use the Basic Plan Information window. This window always contains the Plan Information described above for the plan which you are adding a phase.

The Basic Plan Information window also provides the capability to copy large amounts of planning data from Current or from other plans. For instance, the Friendly Situation selection allows you to copy the Friendly Situation from Current, from another plan/phase, or from scratch ("New"). Copying the friendly situation from another plan/phase will copy all of the friendly units and friendly geometries from the selected plan/phase as well as the Organization for Combat and the Friendly Situation information (which includes the plan echelon and the names of the maneuver sectors). Copying the Friendly Situation from Current will copy all friendly units and friendly geometries in the Current situation. When selecting "New", no friendly units or geometries will be created in the plan/phase initially.

A. To Create a New Plan.

1. Select "Situations | New Plan...".
2. The Basic Plan Information window will open. Enter the plan name into the plan name field. Note that phase 1 of this plan will be created first.
3. The Basic Plan Info window allows copying pieces of other plans or of Current to construct this plan. Pieces you can copy over are the Friendly and Enemy Situations, the Plan Text, the Map Mod, Map

Setup, Guidance Set, and the individual Guidances. Select where to copy each of these pieces from.

4. The Plan Alias field is used to allow TACFIRE devices to send us information for this plan. Enter the appropriate Plan Alias for this phase.
5. Next, click "OK" to start the construction of this plan.
6. Wait for a low level alert to appear which will say that creation of the plan is complete.
7. After viewing this alert, open the new plan (see next section).

B. To Open a Plan.

1. Select "Situations | Open Plan...".
2. The Select Plan window will open. In the window will be a list of plan names next to a list of phases for the selected plan.
3. Select a plan and a phase of that plan.
4. Click "OK". The Planning window will open.

C. To Close an Open Plan.

1. Select "Planning | Exit Plan".
2. Confirm the confirmation asking if you really want to close the plan.
3. The Planning window will close.

D. To Delete a Plan.

1. Select "Situations | Open Plan...".
2. Select the plan you wish to delete.
3. Select "Delete Plan..." and confirm the confirmation window.
4. A low level alert will appear when the entire plan is completely deleted.

E. To Create a New Phase of an Existing Plan.

1. Select "Situations | Open Plan...".
2. The Select Plan list will open. Select a plan and then select "New Phase...".
3. The Basic Plan Information window will open. This window allows copying pieces of other plans or of Current to construct this plan. Pieces you can copy over are the Friendly and Enemy Situations, the Plan Text, the Map Mod, Map Setup, Guidance Set, and the individual Guidances. Select where to copy each of these pieces from.
4. The Plan Alias field is used to allow TACFIRE devices to send us information for this plan. Enter the appropriate Plan Alias for this phase.
5. Next, click "OK" to start the construction of this phase.
6. Wait for a low level alert to appear which will say that creation of the phase is complete.

7. After viewing this alert, open the new phase of the plan (see next section).

F. To Delete a Phase of a Plan. Only the last phase of a plan may be deleted. This is because a phase relies on prior phases when creating and when modifying.

1. Select “Situations | Open Plan...”.
2. Select the Plan and the last Phase of that to Delete.
3. Select Delete... and confirm at the Confirm Delete window.
4. The selected phase and all phases after it will be deleted.
5. A low level alert will appear when the phase has been deleted.
6. Cancel out of the Select Plan and Phase window.

G. Written Operations Orders.

AFATDS gives the commander, fire support officer, and other staff members the ability to develop, save, print, and send a five paragraph OPORD/OPLAN, with all attachments. This OPORD can be refined, modified, and electronically sent to higher headquarters and subordinate units in just a matter of minutes. This functionality can also be used to send warning, fragmentary and movement orders.

Each AFATDS Plan has an associated global written plan, i.e. the written plan applies to all Phases within the Plan. The written plan may consist of:

- One five paragraph document named "OPORD". The OPORD may have associated Annexes.
- Multiple annexes differentiated by a name of up to 30 characters. Each annex may have associated Appendixes.
- Multiple appendixes differentiated by a name of up to 30 characters. Each appendix may have associated Tabs.
- Multiple Tabs differentiated by a name of up to 30 characters. Each Tab may have associated Enclosures.
- Multiple Enclosures differentiated by a name of up to 30 characters.
- One document named "FA Support Matrix".
- One document named "FS Execution Matrix".

NOTE!
The 30 character limit is imposed by interoperability with external systems. Care should be taken in establishing a standard naming convention that accommodates the full range of subordinate documents, e.g., a doctrinal title such as "Enclosure 1 (map guide) to Tab A (Ammo Sites) to Appendix 6 (Pre-positioned Ammo) to Annex F (Fire Support) to

OPORD 3-35" might be expressed as "E1_TA_Ap6_AxF_3-35", whereas "Annex F Fire Support 3-35" would also be acceptable for the higher level parent document, but might cause confusion when naming subordinate documents. Care should also be taken in returning commented documents to another OPFAC as an exact match in the document name will replace the original at the receiving OPFAC. Continuing with the above example, if 2nd Battalion returns comments to DIVARTY, "E1_TA_Ap6_AxF_3-35_(2Bn cmt)" would prevent an unintentional overwrite of the original document, clearly identifies the document under comment, clearly identifies the source of the comment and only uses a 28 character name. Naming is also important because non-AFATDS systems likely cannot maintain the association between parent and child documents, i.e., if you name the first Appendix in each of ten Annexes "Appendix 1" and send each Annex (which sends all of its child documents) to a Non-AFATDS system - at the receiving end they will likely only see the last Appendix 1, each having replaced the one prior. The same holds true for AFATDS receipt of same-name documents from other systems. However, within AFATDS devices, the parent/child relationship of plan documents is maintained during the transfer process.

To access plan text.

1. Select “Situations | Open Plan...”.
2. Select a plan from the Select Plan window. Click OK. The Plan window will open.
3. Select "Planning | Text | Index. Text Index window will now open.
4. Highlighting the parent document (e.g., OPORD is the parent of an ANNEX, an ANNEX is the parent of an APPENDIX), and selecting “Options | New” will open a new child document. When the new document opens, give the documents a unique descriptive name. Highlighting a document and selecting “Options | Edit” will open that specific document.
5. Within the document window is a PARAGRAPH section with a list of paragraph selections. Highlighting a paragraph selection and selecting the “Edit” button will open a text entry window. Highlighting a paragraph selection and selecting the “Copy From…” button will open a selection window that will automatically copy the complete contents of the specified document-paragraph into this paragraph. For manual copy & paste editing, multiple document-paragraph windows may be opened – though window clutter is extreme and care should be taken when deleting text in this manner. Click OK for each completed window.

Various guidance can be inserted into the written plan. They are inserted while editing a Annex, Appendix, Tab or Enclosure by clicking the text cursor where you would like the text placed and then selecting the appropriate item under the "Insert" menu.

AFATDS provides a textual representation of the FS Execution Matrix and the FA Support Matrix. From the Plan Main Menu Bar select “Planning | Text | …” and either matrix. The matrix window will open with a grid consisting of units and phases. Select an empty row to type in the name of the unit. Select “Options | …” to add (an new empty row will appear)or remove units (the highlighted unit/row will be removed). Select “Options | …” to add (an new empty column will appear)or remove Phases (the highlighted phase/column will be removed). Select an empty grid intersection to type in textual instructions. A remarks block is provided for other clarifying textual information. Either matrix may be inserted into a specific document (Annex, etc.) of the written plan from within that document using the “Insert” feature.

Planning for Fire Support
Transmitting Plans

A. AFATDS supports the transmission (or transfer) of plans between AFATDS OPFACs and between AFATDS and Non-AFATDS OPFACs. The transmission may be via tactical communications (e.g., radio, wireline, EPLARS, etc.) or physically on an optical disk. To save transmission time over the tactical communications, the operator can select portions of the plan to send. For example, an FA Planner may transmit the portions of the plan-phase to the supported FSE which were modified or adjusted by the FA Planner such as the FA attack guidances. Plans may also be sent in their entirety (OPORD, guidances, geometries, unit data and targets).

B. The Send Plan window is the primary tool for an operator to specify the portions of a plan-phase to transmit to another OPFAC. The Send Plan window is accessed by selecting "Situations | Transfer Plan..." from the Main Menu Bar and then selecting the desired plan-phase from the Select Plan and Phase window.

C. The operator can choose to send ALL or SELECTED PARTS of the plan-phase by selecting appropriate subcategories of plan information. For the transmission of a plan. AFATDS planning data is divided into Groups, Categories and Subcategories of information. The "Groups" are Guidances, Geometries, Units, Targets, and Written Text. There is one additional Information Type in the menu. This selection is ALL DATA, which will allow for the rapid selection of all four of the Information types with a single selection. The Text Class is at the Plan level only, while the other classes are at the plan-phase level. The table below reflects all the information types, categories and subcategories in which planning data is selectable for transfer. Likewise, a Select All and Deselect All button is located below the Category display window and allows for the operator to select or deselect ALL of the Categories of a Information Type Group.

Table 18. Transfer Plan Categories

Group	**Category**	**Sub-Category**
Guidances	Target	Target Selection Standards
		Mission Routing
		Special Target Allocation

Table 18. Transfer Plan Categories		
Group	**Category**	**Sub-Category**
		High Value Target List
		TMM
		Mission Prioritization
	FS Attack Systems	Naval Gun Attack Methods
		Naval Cruise Missile Attack Methods
		Naval Land Attack Missile Attack Methods
		Naval Restrictions
		Air Attack Methods
		Aviation Attack Methods
		Mortar Attack Methods
		FS System Attack Methods
		FS Munition Restrictions
		FS System Attack
		Mortar Restrictions
		Mortar Immediate Attack Methods
	Unit and Sensor Systems	Reporting Guidance
		CSR Guidance
	FA Attack Methods	FA Preference Table
		FA Cannon Attack Methods
		FA Rocket/Missile Attack Methods
		FA Restrictions
		FA Immediate Attack Methods
	C3	MET Guidance
		Survey Guidance

Table 18. Transfer Plan Categories		
Group	**Category**	**Sub-Category**
		Movement Guidance
		Rocket Missile Guidance
Units	Friendly	Friendly (by unit ID)
	Enemy	Enemy (by unit ID)
Targets	Target Lists	Target Lists (by name)
	Schedules of Fires	Schedules of Fires (by name)
	Fire Plans	Fire Plans/Groups/Series (by name)
Geometries	Friendly	Movement
		NBC
		FSCM and Target Areas
		Sensor Zones
		Battle Areas
		Boundaries
		Situation Graphics
	Enemy	Movement
		NBC
		FSCM and Target Areas
		Sensor Zones
		Battle Areas
		Boundaries
		Situation Graphics
Text	Blocks	Operation Order

Table 18. Transfer Plan Categories		
Group	**Category**	**Sub-Category**
		Fire Support Annex
	Matrices	FA Support Matrix
		FS Execution Matrix

NOTE!

When a parent document (e.g., an Annex is the parent of an Appendix, which is the parent of a Tab) is selected for transmission, all its child documents are transmitted, i.e., it is not necessary to individually select all documents. When individual child documents are selected, only the selected documents are transmitted, i.e., not the parent documents.

D. Transmission to a Non-AFATDS OPFAC.
1. When AFATDS sends plan transmissions to non-AFATDS OPFACs, it only sends data the non-AFATDS device type can understand.
2. AFATDS alerts the operator if any information is missing in AFATDS that is required by a non-AFATDS OPFAC when a plan is transmitted. For example, if the Plan Alias is left blank but required by the non-AFATDS OPFAC, AFATDS will alert the operator sending the plan with a Failed Transmission Alert.

E. Transfer on Optical Disk.
1. When copying a plan to optical disk, no selectivity is allowed; the entire plan will be copied to the disk. That is, selections on the Send Plan window are irrelevant and do not need to be made when exporting to optical disk.
2. If the Archive check box is checked on the Send Plan window, the Export Situation window will be displayed after the operator selects Send. When the Export Situation window is opened, all workstation names and the device status (Ready or No Disk) of each will be displayed.
3. On the Export Situation window, the operator selects an Archive Device which has a READY status and then selects the EXPORT button. This causes AFATDS to copy the plan-phase to the disk. When finished, the Export Situation window will close.
4. A low level alert will be generated as soon as the copy to disk is complete.

F. Transmitting/Transferring a Plan. Remember -- transferring a plan via the communications or via an optical disk requires that a COA has been selected for the last phase of the plan.

To select a COA.

1. Open Plan.
2. When Planning window appears, select "Planning | COAs | Select COA.
3. At Select COA window choose an available COA. Click OK.

IMPORTANT!!

Successful transmission of a plan via communications is a function of the media and speed of the communications as well as the amount of data being transferred. Generally, the smaller the amount of information being transferred and the faster the speed of transmission, the higher the chance the transmission will be successful.

Attempt to use faster, more reliable networks (e.g., use a VMF 4800 bps net instead of a TACFIRE 1200 bps net) and send the plan in parts (e.g., send Units and Geometries in one transmission and Guidance and Text in another rather than all at once).

1.	Ensure that the last phase of the plan has a COA selected.
2.	Select “Situations | Transfer Plan...”.
3.	Select the plan and phase of the plan to transfer. Select OK.

4.	The Send Plan window will appear. Select the mode by which the Plan will be transferred by selecting Archive or COMM. The data groups are listed under "Information Types". The selections are Guidances, Units, Targets, Geometries, Text and All Data. The All Data selection selects all the Informational types (Guidances, Units, Targets, Geometries, Text). If Archive is chosen, the categories are not accessible because they will all be transferred to the Optical Disk. However if COMM is selected, the categories will be highlighted and the operator will be able to select groups, categories and sub-categories to be transferred for the selected plan. Using the Select All and Deselect ALL buttons located below the Category and Sub category display windows will allow for the operator to select or deselect all of the items in the list categories or sub-categories displayed above the buttons.
5a.	If transferring by COMM, after all selections are made select SEND on the Send Plan window. A list of destination units/distribution list will appear. The operator will have the opportunity to select the units or distribution list to which to send the plan. After selection is made Click OK.
5b.	If sending by Optical Disk, a list of workstations will appear: next to each is the status of the optical disk. Select a workstation's optical disk to copy the plan to, and then click Export. The window will close.
6.	A low level alert will be generated when the plan finishes transferring.

G. <u>To Import a Plan from Optical Disk.</u>

1.	Select "Situations | Import Plan...".
2.	The Import Situation window will appear with a list of workstations with optical disks.
3.	Select the workstation at which the optical disk is inserted. Select the Plan you wish to import and click Import.
4.	After a delay the plan will be imported and a low level alert will be generated.
5.	Now the plan has been "received" into the OPFAC. We must now preview the plan.

H. To Preview a Received Plan. For all plans received into the OPFAC.

1.	Select “Situations | Received Plans/Current”.
2.	The Received Plans/Current window will open with a list of Plans and Source Units. This is a list of units which have sent us plans.
3.	Select the received Plan you wish to preview. Select Preview.

Planning for Fire Support
Implementing Plans

AFATDS supports the capability for the operator to select a fire support plan/phase and to transition that plan/phase to the current situation. The current situation will be updated with the information (guidances, units, geometries, target data, fire plans etc.) contained in the selected plan/phase.

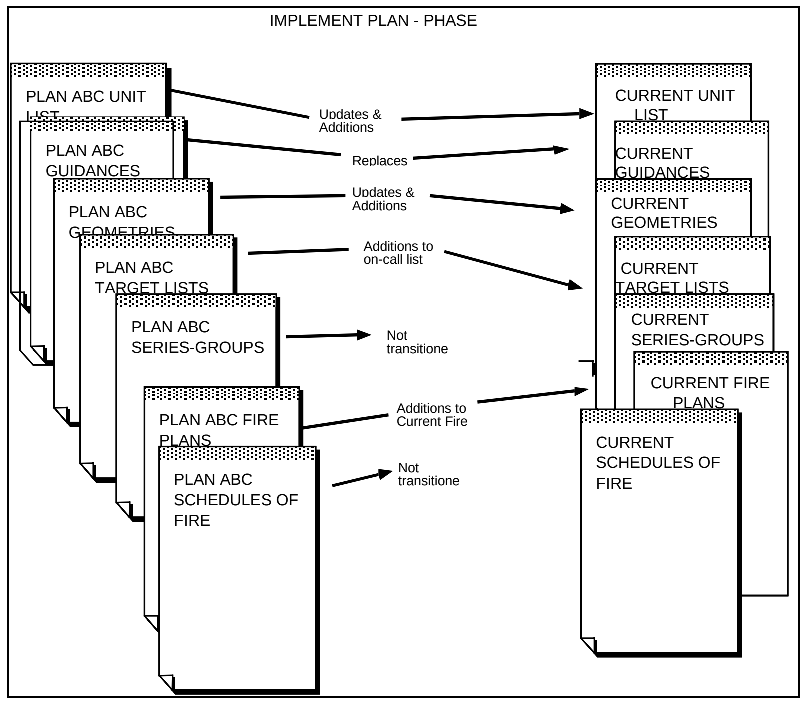


Figure 44. Only Some Parts of a Plan are Implemented into Current

IMPORTANT!!

The default MAP MOD for transferred plans is North American 1927. If operating in a MAP MOD other than North American 1927, received plans should: (1) be opened, (2) the MAP MOD changed to the desired MAP MOD, (3) the plan closed, and (4) the plan reopened. The plan is now in the desired MAP MOD.

The window which supports implementing the plan into Current allows you to select those components of the plan-phase which you want to be implemented; to establish the H-Hour for H-Hour related geometries and fire plans; and to compare the guidances for the plan-phase against those in the current situation. This window will indirectly show you a comparison of guidances between planning and current: you will not be able to select guidances to be implemented which are identical to those in Current, based on the DTG created.

The transition of a plan/phase to the Current situation is initiated by the operator at each OPFAC and cannot be done from another OPFAC. One OPFAC can not cause other OPFACs to automatically transition a plan. Operationally, the FSE, it's Supporting FA unit(s) and that FA unit's fire units, implement the same plan at the same time. This, at a minimum, requires messages (PTMs) of some kind to be sent (under operator control) to appropriate OPFACs advising them that a plan-phase is to be implemented (including H-Hour and which data elements of the plan to be implemented). This would cue the operator at the receiving OPFACs to implement the same plan at the appropriate time.

The Implement Plan window is the primary tool for an operator to specify if all or some portions of a plan-phase will be implemented. This window is accessed after selection of "Situations | Implement Plan" from the Main Menu Bar and after then you select the plan-phase. You can select all or parts of the plan-phase to be implemented to Current based on the DTG created.

IMPORTANT!!

Implementing a plan requires that a COA has been selected for the phase you are going to implement.

To Implement a Plan.

1.	Ensure that the last phase has a COA selected.
2.	Select "Situations | Implement Plan...".
3.	Select the plan and phase of the plan to implement.
4.	Select OK.
5.	The Implement Plan window will appear. On this window will be four categories of information to implement: Guidance, Geometries, Units, and Targets. Select the pieces of each plan you wish to implement.
6	Click Implement on the Implement Plan window.
7.	A low level alert will be generated when the plan finishes implementation.

When implementing the plan, AFATDS planning information is divided into Groups, Categories and Subcategories of data. The Groups of data are Guidances, Geometries, Units and Targets. The table below reflects all the groups, categories and subcategories in which planning data is identifiable for implementation.

Table 19. Implement Plan Categories

Group	**Category**	**Sub-Category**
Guidances	Target	Target Selection Standards
		Mission Routing
		Special Target Allocation
		High Value Target List
		TMM
		Mission Prioritization
	FS Attack Systems	Naval Gun Attack Methods
		Naval Cruise Missile Attack Methods
		Naval Land Attack Missile Attack Methods
		Naval Restrictions

Table 19. Implement Plan Categories		
Group	**Category**	**Sub-Category**
		Air Attack Methods
		Aviation Attack Methods
		Mortar Attack Methods
		FS System Attack Methods
		FS Munition Restrictions
		FS System Attack
		Mortar Restrictions
		Mortar Immediate Attack Methods
	Unit and Sensor Systems	Reporting Guidance
		CSR Guidance
	FA Attack Methods	FA Preference Table
		FA Cannon Attack Methods
		Rocket/Missile Attack Methods
		FA Restrictions
		FA Immediate Attack Methods
	C3	MET Guidance
		Survey Guidance
		Movement Guidance
		Rocket Missile Guidance
Units	Friendly	All Units
	Enemy	All Units
Targets	Target Lists	Target Lists (by name)

Table 19. Implement Plan Categories		
Group	**Category**	**Sub-Category**
	Fire Plans	Fire Plans/Groups/Series (by name)
Geometries	Friendly	Movement
		NBC
		FSCM and Target Areas
		Sensor Zones
		Battle Areas
		Boundaries
		Situation Graphics
	Enemy	Movement
		NBC
		FSCM and Target Areas
		Sensor Zones
		Battle Areas
		Boundaries
		Situation Graphics

A. Plan and Phase Level Information.

1. You can establish the H-Hour on the Implement Plan window. The H-Hour is the base time used to convert all plan-phase geometries which have Effective Time and Expiration Time entries expressed in minutes relative to H-Hour. For example, a Restrictive Fire Area may have an Effective Time of H+ 60 and an Expiration Time of H+1440. If the operator enters 271200APR96 as H-Hour on the Implement Plan window, and the RFA is selected for implementation, the Effective Time will be converted to an actual time of 271300APR96 and the Expiration Time will be converted to 281200APR96. Note that plan data with an H-Hour time is not transitioned unless H-hour time is specified.
2. The written plan is not transitioned to Current but instead stays with the implemented plan. As long as the plan is not deleted, the written plan can be accessed at any time.

B. Guidance.

1. AFATDS automatically compares the guidances for the plan-phase with those for the current situation. You are prevented from selecting any guidance subcategory for implementation which is not different than that guidance in the current situation; i.e. the select button will not highlight if you click on it.
2. Implemented plan-phase guidances will replace their current counterpart (for example, plan/phase FA Attack Methods guidance will replace the current FA Attack Methods guidance.)

C. Geometries.

1. Geometries are implemented as replacements and additions to the current geometry. Geometries that were in the current situation and not replaced by an implemented geometry continue in effect in accordance with their respective effective and expiration DTGs.
2. When a new plan is implemented, the geometries may appear to be superimposed over the existing current situation graphics.
   a. An existing geometry of the same type and with the exact same name as a geometry in the newly implemented plan will be updated with the new location and effective/expiration times.
   b. An existing geometry of the same type but a different name will remain in the current situation until it expires or until deleted by the operator (for example, two different yet similar boundary lines, 1 Bde Rear and 1 Bde Rear BL, will both be displayed).
   c. An existing geometry that is not part of the newly implemented plan will remain in the current situation until it expires or until deleted by the operator (i.e.; Phase Line Yellow in Current is not in the newly implemented plan, but will be displayed until it expires or is deleted out of current by the operator).

D. Units.

WARNING!!

Do not allow a unit to have a different unit type in Planning as it has in Current. This will cause problems when you Implement the Plan.

1. Implemented planned units which are not in the current situation are added to the current unit list at the OPFAC. You will be alerted about all units that are new to the current situation. Planned unit information only has some of the pieces that current unit information

does. For example, ammunition and equipment status are not stored in planning but only in Current.

2. When a planned unit is implemented and if that unit exists in the current situation as well, the command and supporting relationships (e.g. CONOPS units, Supported HQs, Command HQ), Unit Mission, and Laser Code (if applicable) established in the plan become current. Other information associated with the planned unit (e.g., location, traverse limits, etc.) does not become current.
3. If a unit exists in the current situation, but not in the implemented plan-phase, no change is made to the unit's information due to the plan-phase implementation process.

E. Targets.

1. The targets associated with the planned target list(s) that are transitioned are added to the current "On-Call" target list at the implementing OPFAC.
2. In cases where the transitioned target list and the current on-call list contain target numbers that are duplicates, the on-call list target with that number continues to appear on the "On-Call" target list after transition.
3. Implemented fire plans, series, and groups to the current situation at the implementing OPFAC are added.
4. Schedules of Fire are not transitioned to Current.

F. Printing the Situation Database.

The SITUATIONS menu has a PRINT selection that will allow the operator to select items from the CURRENT or PLANNED SITUATIONS database for print output. The operator can further select from the following areas of the CURRENT or PLANNED SITUATIONS database the following general areas:

1. Geometries
2. Guidances
3. Unit
4. Targets
5. Text (Planned Only)

The operator can choose from all of the items available and print only the information he desires from the database as needed.

NOTE!

Selecting received/sent message types for printing on the Configuration Message Setup window will cause the specified message types to be printed when sent to/received from non-AFATDS systems. This function WILL NOT print messages sent to/received from other AFATDS devices.

G. Operations During Transition.

The OPFAC implementing the plan must continue to conduct normal processing functions as the plan is being implemented. Specifically the following is true.

1. Active missions in progress during plan implementation continue processing.
2. Active missions undergoing target or attack analysis are subject to the guidance, geometry, and unit data as it is transitioned.

Fire Planning Overview

> Fire planning begins with the commander's guidance and/or intent. It continues through the development of a prioritized list specifying what targets are to be attacked and when (*decide*), the acquisition of those high-payoff targets (*detect*), and the determination of attack options to be used (fire support, maneuver, electronic warfare [EW], or a combination) to defeat the target (*deliver*). The process ends with the assessment of the effects of the target.
>
> FM 6-20-40, p. 2-8

AFATDS supports deliberate (formal) and quick (informal) fire planning. Target lists, groups, series, fire plans and schedules of fire are developed and maintained for both current and plan-phase situations.

A. <u>Creating Target Lists.</u> A standard Target List window is used for both current and plan situations. The target list window displays target data based on how you want to see it. Under the "List" menu item on a target list window, use the "Select data fields" option to select the fields you want to see. For example, the "Active target list" is more useful when you display such items as "Mission Status", "Operational Until time", "Mission Type" and "Method of control". The operator can delete targets and add targets to a target list by creating new targets, copying targets from one target list to another and adding targets from the map.

1. <u>Current Target Lists</u>. AFATDS maintains seven (7) permanent target lists in the current situation. Active, Inactive, On Call, Planned, Suspect, and Amphibious Task Force (ATF) (USMC) target list. The operator may also create any number of Air Support Lists (ASL) and "operator named" target lists.

   a. <u>Active</u>. All currently active targets are placed on this list when initiated or executed as fire missions. A target which receives an MFR or DENY gets taken from this list and placed on the Inactive target list. A target which receives an EOM RAT (Record as Target) gets taken from this list and placed on the On Call Target list.

b. Inactive. Active targets that receive an MFR or Deny, and On Call targets that receive a Cancel Target Record (CTR) are placed on this list. Also, ATIs with a precedence of I or A that pass TSS, and are not high pay-off targets(HPTs) are placed on this list. The operator can delete individual targets using the Target menu.

c On Call. Active targets that receive an EOM, RAT are placed on this list. Additionally, targets that are assigned to current groups, series, fire plans and/or schedules of fire, and targets that are implemented into current from a plan-phase target list, group or series are placed on this list. Targets that are assigned to groups, series and/or schedules of fire will be listed multiple times. The operator can create new targets, add targets from the map or delete targets using the Target menu.

NOTE!

Extreme care should be taken when deleting targets from the On Call List. If an instance of a target is deleted and that target is a Fire Plan or on a Schedule of Fires then the target will also be removed from the plan or schedule.

d. Planned. Targets that are received as ATIs, pass TSS and have a precedence of Planned on the TMM are placed on this list. The operator can establish new targets on this list from the Mission Processing/Messages/Establish Target menu selection. Also targets can be copied from the current situation map using the Target/Add From Map menu selection, or the Add to Target List on an enemy symbol map popup menu. NNFP targets received from a TACFIRE, IFSAS, FED or FDMD will be placed on this list when the Plan name is not sent or does not match a plan alias in the receiving AFATDS database.

e. Suspect. Targets that are received as ATIs, and do not pass TSS are placed on this list. New suspect targets can be created from the Target/New menu selection.

f. Air Support List (ASL). The ASL contains air mission data to support tactical air operations. The ASL is similar to any target list in AFATDS. The ASL will contain data on both “fires” and “non-fires” air missions. ASL are normally created based on “Air Day” and will contain the Air Support Request (ASR) which are created to support that “Air Day”. The status of ASRs, along with the information entered for the ASRs are available for viewing, sorting and printing on the ASL.

g. Amphibious Task Force (ATF). The process allows fire support personnel to create, maintain, and transmit a target list during the planning for and conduct of amphibious operations. Prior to D-Day, an ATF target list consists of seven parts as follows:

Part	**Description**
1.	Targets designated for detection during supporting or pre-assault operations.
2.	Targets designated for neutralization during supporting on pre-assault operations.
3.	Targets designated for harassment during supporting or pre-assault operations.
4.	Targets designated for destruction by the ATF.
5.	Targets designated for neutralization by the ATF.
6.	Targets designated for harassment by the ATF.
7.	Restricted targets to be attacked only on order of the Commander, ATF (CATF) or the Commander, Landing Force (CLF).

In the planning context, AFATDS will associate a part number with each target on the ATF target list. After D-Day the use of parts in discontinued.

Targets will be classified, A through E, based on the type threat they pose to the ATF or on the degree of restriction placed on how they are attacked. Target classifications are as follows:

Class	**Description**
A.	Installations that threaten ships, aircraft, minesweeping, and underwater demolition operations.
B.	Installations that threaten assault forces in the ship-to-shore movement and assault of the beach.
C.	Installations that threaten or oppose landing force

Class	Description
	operations after landing or affect the ability of the enemy to continue resistance.
D.	Installations that will not be attacked on prior to D-Day.
E.	Installations that must not be destroyed (unless specifically ordered by CATF) because of their potential future use by friendly forces or because of humanitarian reasons.

Targets will be prioritized, I through IV, based on their relative capability to affect friendly force operations. Target priorities are as follows:

Priority	Description
I.	Targets capable of preventing the executions of the plan of action of the ATF or its elements.
II.	Targets capable of immediate serious interference with the plan of action of the ATF or its elements.
III.	Targets capable of ultimate serious interference with the plan of action of the ATF or its elements.
IV.	Targets capable of limited interference with the plan of action of the ATF or its elements.

2. Named Target Lists. These are lists created by the operator to allow differentiation of various targets. For example, the operator may chose to create a new target list named "SEAD Targets" and place all ADA type targets on this list. This will allow the operator to better manage his target information when conducting fire planning operations.

Editing a Target List in Current

No.	Action
1.	Select "Targets | Target Lists". Select the target list you wish to edit and OK.
2.	The target list window will open.

No.	Action
3a.	To COPY A TARGET FROM ANOTHER TARGET LIST, select the list in the right hand list and click the LEFT ARROW to copy the entire target list or click "Open" and then select the target(s) to copy and click the LEFT ARROW. To return to the list of targets, click on "Previous".
3b.	To CREATE A NEW TARGET for the On Call target list, select "Target | New..." or select a target and then "Target | Copy...".
3c.	To ADD A TARGET FROM THE MAP, select the target(s) on the map and then select "Target | Add From Map".
3d.	To DELETE A TARGET from the list, select the target and select "Target | Delete...".
3e.	To INITIATE A FIRE MISSION off of a target on the list, select the target and then "Target | Initiate Fire Mission".
3f.	To SORT THE TARGET LIST, select "List | Sort" and then the option to sort by.
3g.	To SEND the target list to another unit, click "Send...".
4.	Click OK to save this target list.

3. Plan-Phase Target Lists. Each phase of a plan has a permanent master target list that maintains a record for each target that is added to the plan-phase database. This master target list will have the same name as the plan alias. If no plan alias is present then AFATDS will assign a numeric name to the list. It is **NOT** intended to be an operational target list and cannot be transferred with a plan-phase. The operator can create multiple operational "named" target lists for each plan-phase situation.

   a. New targets can be created , added from the map or deleted through the target menu. Targets can be copied from the master target list, other plan-phase target lists or current target lists.

   b. When NNFP targets are received from an IFSAS or observer and the Plan name matches a plan alias in the receiving AFATDS database, a new target list is automatically created with a unique name using both the plan alias and the sending unit's ID. For example, Plan Hammer has a plan alias of BLUE, and COLT 1 sends NNFP targets with a plan name of BLUE. A new target list named BLUE/COLT 1 is created and the target is added to the target list, or the target is added to an existing target list BLUE/COLT 1.

c. When **Add to Target List** is selected from an enemy unit symbol popup menu, it is added to the plan-phase master target list, and the operator can copy the target to any other plan-phase target list.

<u>Creating/Editing a Target List in Planning</u>

No.	Action
1.	Select "Targets | Target Lists | New...", or "Targets | Target Lists | Edit" and select the target list you wish to edit and OK.
2.	The target list window will open. If new, enter a name for the target list.
3a.	To COPY A TARGET FROM ANOTHER TARGET LIST, select the list in the right hand list and click the LEFT ARROW to copy the entire target list or click "Open" and then select the target(s) to copy and click the LEFT ARROW. To return to the list of targets, click on "Previous".
3b.	To CREATE A NEW TARGET for the list, select "Target | New..." or select a target and then "Target | Copy...". (When you copy a target, make sure that you change or delete the target number on the target information section when it opens or otherwise you will end up changing the data for the original target).
3c.	To ADD A TARGET FROM THE MAP, select the target(s) on the map and then select "Target | Add From Map".
3d.	To DELETE A TARGET from the list, select the target and select "Target | Delete...".
3e.	To INITIATE A FIRE MISSION off of a target on the list, select the target and then "Target | Initiate Fire Mission". (Note that generally you should not initiate missions from a plan. Do it in Current).
3f.	To SORT THE LIST, select "List | Sort" and then the option to sort by.
3g.	To SEND the target list to another unit, click "Send...".
4.	Click OK to save this target list.

Sending Targets from a FIST DMD or FED to an AFATDS

No.	Location	Device	Action
1.	Sensor	FIST DMD or FED	The observer sends a FIREPLAN message to the FSE • The PLAN entry must be set to either the FS plan-phase's plan alias or blank for a Current planned target.
2.	FSE	AFATDS	The AFATDS will store the target in a target list as described above.

4. Groups and Series. The AFATDS operator can create and edit multiple groups and series, in both the current situation and the planning situation.

   a. Groups are created by copying individual targets from target lists, groups and series, and by adding targets from the situation map, similar to copying targets into a target list.

Creating/Editing a Group

No.	Action
1.	Select "Targets | Groups | New...", or Select "Targets | Groups | Edit" and select the group you wish to edit and OK.
2.	The group window will open. If new, enter a name for the group.
3a.	To COPY A TARGET FROM A TARGET LIST, select "Target Lists" in the right hand list and click LEFT ARROW to copy the entire target list or click "Open", select a target list in the right hand list and click "Open" and then select the target(s) to copy and click the LEFT ARROW. To return to the list of target lists, click on "Previous".
3b.	To COPY A TARGET FROM A GROUP, select "Groups" in the right hand list and click LEFT ARROW to copy the entire group or click "Open", select a group in the right hand list and click "Open" and then select the target(s) to copy and click the LEFT ARROW. To return to the list of groups, click on "Previous".
3c.	To ADD A TARGET FROM THE MAP, select the target(s) on the map and then select "Target | Add From Map".

No.	Action
3d.	To REMOVE A TARGET from the group, select the target and select "Target | Delete...".
3e.	To SEND the group to another AFATDS unit, click "Send...".
4.	Click OK to save this group.

b. Series are created by copying individual targets from target lists, groups, and series, by copying entire groups and series and by adding targets from the situation map, similar to copying targets into a target list.

Creating/Editing a Series

No.	Action
1.	Select "Targets | Series | New...", or select "Targets | Series | Edit" and select the series you wish to edit and OK.
2.	The series window will open. If new, enter a name for the series.
3a.	To COPY A TARGET FROM A TARGET LIST, select "Target Lists" in the right hand list and click LEFT ARROW to copy the entire target list or click "Open", select a target list in the right hand list and click "Open" and then select the target(s) to copy and click the LEFT ARROW. To return to the list of target lists, click on "Previous".
3b.	To COPY A TARGET FROM A GROUP, select "Groups" in the right hand list and click LEFT ARROW to copy the entire group or click "Open", select a group in the right hand list and click "Open" and then select the target(s) to copy and click the LEFT ARROW. To return to the list of groups, click on "Previous".
3c.	To COPY A TARGET FROM A SERIES, select "Series" in the right hand list and click LEFT ARROW to copy the entire series or click "Open", select a series in the right hand list and click "Open" and then select the target(s) to copy and click the LEFT ARROW. To return to the list of series, click on "Previous".
3d.	To ADD A TARGET FROM THE MAP, select the target(s) on the map and then select "Target | Add From Map".
3e.	To REMOVE A TARGET from the series, select the target and select "Target | Delete...".

No.	Action
3f.	To SEND the series to another AFATDS unit, click "Send...".
4.	Enter offset times, in minutes, for targets in the series.
5.	Click OK to save this series.

c. Transmitting Groups and Series. Sending groups and series to non-AFATDS systems (such as IFSAS) should be accomplished by constructing individual fire plans incorporating group and series (if applicable). In general, it is best to construct a single fire plan that incorporates all necessary groups and series for a given preparation, counter preparation, or program of targets (e.g. SEAD). It is not necessary or recommended to send individual groups or series of targets to IFSAS.

5. Pre-Coordination of Targets. The operator can view coordination requirements for a target from a target list by highlighting the target on the target list and selecting **List/Check for Coordination**. AFATDS determines FSCM violations based on the present conditions and presents a coordination request to the operator that identifies the coordination requirements and the agency/unit to coordinate with. The operator can override or deny the coordination requirement, or send a coordination request to the coordinating agency.

Pre-Coordination of Targets

No.	Action
1.	Select "Targets | Target Lists" and the target list the target(s) are on.
2.	Select a target to pre-coordinate.
3.	Select "List | Check for Coordination".
4.	If any coordination is required, the Coordination Request window will appear. You can send a coordination request at this time, override coordination or deny coordination.
5.	Continue until all targets have been coordinated.

IMPORTANT!!

Pre-coordination of targets does not preclude AFATDS from generating another coordination request when the target is processed as an active mission.

6. Sort and Search Capability.

a. Sort Capability.

The operator has an optional sort capability available. Using the sort capability the operator is able to relist the targets based on one of the following parameters. A second sort by target number is conducted when two or more targets have the same value (e.g., three targets each having a strength of 10 for the sort parameter).

1). Target Number.
2). ASR Number.
3). BE Number.
4). ABCA Number.
5). Target Type.
6). Mission Status.
7). Originator.
8). Maneuver Zone.
9). Acquisition Time.
10). Operational Time.
11). Target Location Error.
12). Reliability.
13). Payoff.
14). ATF Classification.
15). ATF Priority.
16). ATF Part Number.

b. Search Capability.

AFATDS provides the operator the capability to search an individual target list (including the ATF target list), or search all target lists maintained at the OPFAC. Additionally, the search message can be sent to another AFATDS OPFAC or to a Package 11 device type. When the results are returned to your OPFAC you will be alerted and given the capability to save the targets to one of your target lists or a fire plan. AFATDS will allow the operator to search target list(s) for targets meeting any combination of the following parameters (any of the parameters may be left unspecified, and thus will not be considered in the search).

1). One or more target categories (TVA category e.g., ADA, FA, ENG).
2). One or more target types (Inf., Work Party, etc.).
3). Time Target Developed or last updated (from DTG from - to window).
4). In an established area geometry (ZOR, TAI, Battle Area, etc.).
5). High Payoff Target (based on target guidance for the context) The search is not possible unless a context (plan-phase or current) is specified.
6). Mission Status (for active targets only).
7). Target Center in an operator defined area (circular, rectangular, irregular).

B. Building a Fire Plan. The AFATDS operator can create multiple fire plans in the current situation as well as in the planning situation. Current situation fire plans can be created with known (absolute) start and end times, or with relative (On-Call) start and end times. Plan-phase situation, fire plans can be created with absolute, On Call or H-Hour related start and end times. A fire plan is created by copying individual targets, groups and series into the fire plan and prioritizing the attack of the targets, groups and series by specifying target offsets or ranks.

1. Target Offset Times and Ranks.

- Each fire plan has a Start and Stop Time. When the time relationship for the fire plan is "H-hour", AFATDS allows the operator to specify a negative start time (e.g., "-10"). This means when you implement the Plan/phase, the start time of the fire plan will be 10 minutes prior to the H-hour time.
- Target offsets are used to specify a specific time, relative to the fire plan start time, that a target, group or series is to be scheduled for attack. For example, a H-hour related fire plan with a start time of "-10" has a target with an offset time of "+5". This means that the target will be scheduled at H-hour minus 5 minutes.
- Target ranks are used to prioritize the scheduling of targets that are not assigned an offset.
- Multiple targets can be assigned the same offset time or rank.
- Targets with assigned offsets that cannot be scheduled for attack at the specified offset time are unscheduled.
- Ranked targets will be scheduled for attack at the earliest time available in the schedule. Therefore, it is possible for ranked

targets to be scheduled before or in between targets with assigned offsets.

- The operator can specify offset times for some targets and ranks for others, or both an offset and a rank. AFATDS attempts to schedule all targets with an assigned offset, before scheduling targets that are ranked. If a target has both an offset and a rank, the offset is used.
- It is possible to have targets with assigned offsets that are unscheduled due to unavailability of fire units at the specified offset time, while targets that are ranked are scheduled.
- The operator can edit unit schedules to add unscheduled targets at another offset time, or edit the fire plan to add additional attack units and/or change offset times and recalculate the SOF.
- When a group is placed in the fire plan the operator enters the offset time or rank for the first target in the group. AFATDS will automatically assign the same offset time or rank to the other targets in the group.
- When a series is placed in the fire plan the operator enters the offset time or rank for the first target in that series. AFATDS will automatically assign the offset times or ranks for the other targets in the series based on the relative offsets/ranks established in the series.

IMPORTANT!!

When creating a fire plan, the start and end times should NOT BE EQUAL and also be within four (4) hours of each other. This is because the Schedule of Fires window only displays four hours of schedule time. Target offset times must be 0 or a positive number that is relative to the start time of the Fire Plan. When creating an H-Hour relative Fire Plan with a negative start time (e.g., H-30), enter target offset times relative to a start time of 0. For example, if the start time of an H-Hour Fire Plan is H-30 and the operator wants a target to be attacked at H-30, the target offset time for the target is 0, not -30, and a target to be fired at H-20 would have an offset time of 10.

2. Fire Plan Munitions.

- The operator can specify a first and second FFE shell, fuze and volleys/rounds directly on the fire plan window, for each target in the fire plan.
- The operator can open the Basic Target Information/Method of Engagement window directly from the Fire Plan window and specify a first and second FFE shell, fuze and volleys/rounds for each target on the fire plan. A target copied from a target list may already have the Method of Engagement specified.
- When munitions are not specified on the Fire Plan window, or in the Method of Engagement, AFATDS will use the shell, fuze, volleys/rounds and fire unit size specified for the target type in the Attack Methods Table.
- When munitions are not specified on the Fire Plan window, in the Method of Engagement , or in the Attack Methods Table, AFATDS will determine the munitions type and volume of fire based on the Mission Characteristics Table and TMM effects guidance.

Creating/Editing a Fire Plan

No.	Action
1.	Select "Targets | Fire Plans | New...", or Select "Targets | Fire Plans | Edit" and select a fire plan you wish to edit and OK.
2.	The fire plan window will open. If new, enter a name for the fire plan.
3.	Enter a start time and end time for the fire plan. Entering an On Call offset time requires clicking activate before you can execute fire plan. If the fire plan is in planning, an H-hour time can be entered here instead. (Once the plan/phase is implemented, H-Hour fire plans will be updated with actual times based on the H-Hour DTG of the plan which was implemented).
4a.	To COPY A TARGET FROM A TARGET LIST, select "Target Lists" in the right hand list and click "Open" then select a target list and click LEFT ARROW to copy the entire target list or click "Open" and then select the target(s) to copy and click the LEFT ARROW. To return to the list of target lists, click on "Previous".

No.	Action
4b.	To COPY A TARGET FROM A GROUP, select "Groups" in the right hand list and click "Open", then select a group and click LEFT ARROW to copy the entire target list or select a group in the right hand list and click "Open" and then select the target(s) to copy and click the LEFT ARROW. To return to the list of groups, click on "Previous".
4c.	To COPY A TARGET FROM A SERIES, select "Series" in the right hand list and click "Open", then select a series and click LEFT ARROW to copy the entire series or select a series in the right hand list and click "Open" and then select the target(s) to copy and click the LEFT ARROW. To return to the list of series , click on "Previous".
4d.	To COPY A TARGET FROM A FIRE PLAN, select "Fire Plans" in the right hand list and click "Open", select a fire plan in the right hand list and click "Open" and then select the target(s) to copy and click the LEFT ARROW. To return to the list of fire plans, click on "Previous".
4e.	To ADD A TARGET FROM THE MAP, select the target(s) on the map and then select "Target | Add From Map".
4f.	To REMOVE A TARGET from the fire plan, select the target and select "Target | Delete...".
5.	For each target in the fire plan, enter either an OFFSET TIME or a RANK to be fired. Notice that all targets within a group get assigned the same time automatically and all targets within a series retain their relative times within the series.
6.	For each target in the fire plan, enter FFE 1 and 2 shell, fuze and volleys, if desired.
7.	Click OK to save this fire plan.

NOTE!

Fire plans containing a large number of targets may take several minutes to save.

C. NSFS Fire Planning. AFATDS will not schedule LASM or Tomahawk missile fires in a schedule of fires. If these munitions are to be employed, the munitions should be assigned to these targets on the fire plan window.

Only the munitions type (Tomahawk or LASM) can be assigned. Volume of fire cannot be assigned. If attack methods are stored for Naval Land Attack Missile or Naval Cruise Missile, the volume of fire will be determined from the attack methods. If no attack methods are stored, the volume of fire defaults to one missile. When firing the plan is required, the AFATDS operator executes the fire plan. This allows the scheduled LASM and TLAM targets to be fired as time on target missions in accordance with the plan schedule. The following example explains the process:

The following targets are to be scheduled. A fire plan is constructed with the following information:

TGT	TGT TYPE	MISSILE
AA1000	CP, DIVISION	TLAM
AA1001	AA, TROOPS	LASM
AA1002	CP, REGT	TLAM
AA1003	AA, MECH	LASM

The AFATDS attack methods contain the following:

NAVAL MISSILE ATTACK METHODS:

TGT	MUNITIONS	VOL
AA, TROOPS	LASM	3

NAVAL CRUISE MISSILE ATTACK METHODS:

TGT	MUNITIONS	VOL
CP, DIVISION	TLAM	4

The fire plan is constructed and can be tested for supportability by executing the plan with intervention on for these missions. Intervention ensures the AFATDS will not transmit the missions automatically.

When the plan is executed (assuming a capable option is determined), the following will result:

AA1000 is assigned 4 TLAM missiles with volume of fire determined from attack methods guidance.
AA1001 is assigned 3 LASM with volume of fire determined from attack methods guidance.
AA1002 is assigned 1 TLAM with volume of fire defaulted to 1.
AA1003 is assigned 1 LASM with volume of fire defaulted to 1.

WARNING!!

The NSFS targets should not be transmitted as a schedule of fires, nor should the naval ship unit's Unit Schedule window be used to "force" the scheduling of TLAM or LASM. These practices may result in unpredictable behavior.

D. Creating a Schedule of Fires. One schedule of fires can be calculated for each fire plan and that schedule of fires can be recalculated as many times as needed.

1. Available Units. When the schedule of fires window is first opened, all fire units that are available for scheduling (based on command and support relationships) are listed. The operator can remove units from the list that he does not want to be considered. Units can be added back and the schedule of fires recalculated as desired.

2. Calculation of the Schedule of Fires. AFATDS will attempt to schedule fire plan targets against the available fire units as follows:

   a) First AFATDS considers the shell, fuze and volleys specified by the operator on the fire plan window. When you specify a quantity of volleys on the fire plan window, AFATDS will schedule a single fire unit to fire the specified number of volleys on the target, or on each segment of a segmented target.

   b) When munitions are not specified in the fire plan window (or a capable option could not be developed for those munitions), then AFATDS considers the munitions type and quantity/desired effects specified in the method of engagement for that target.

   c) When munitions are not specified in the fire plan window or in the method of engagement window (or a capable option could not be developed for those munitions), then AFATDS considers the munitions type and quantity, and fire unit size specified in the Attack Methods Table for the appropriate current or plan-phase situation.

   d) When munitions are not specified in the fire plan window, method of engagement, or in the Attack Methods Table, (or a capable option could not be developed for those munitions), then AFATDS considers the system mission characteristics table to determine an effects or volleys attack option.

e) When the munitions are specified and the volleys/rounds are not, AFATDS will determine the volume of fire based on the effects % specified in the method of engagement . If effects are not specified in the method of engagement, the desired effects from the TMM guidance will be used.

f) If no capable options can be produced the target is unscheduled.

g) When the schedule of fires calculation is complete, the scheduled targets, total rounds required and number of unscheduled targets are displayed in the schedule of fires window.

IMPORTANT!!
During the calculation of the schedule of fires, the operator will receive information alerts that provide the scheduling status. These alerts do not indicate the number of targets actually scheduled. Depending on the number of targets in the fire plan, a medium level alert is posted when 1/4, 1/3 or 1/2 of the targets have been processed (not necessarily scheduled). Low level alerts are posted as the calculation progresses.

3. Rates of Fire. The schedule of fires displays firing time for targets scheduled at the max rate of fire in RED and sustained rate of fire in GREEN. The shift time between targets is displayed in BLACK. The first volley of each target does not consume any firing time therefore, single volley targets will only display shift time.

   - The target offset time (TOT) is represented by the start of the firing time for multiple volley targets, and the start of the shift time for single volley targets.
   - Targets assigned to single fire units (not massed) will be scheduled at the max rate of fire for the first three firing minutes of the unit schedule. If all volleys for the target cannot be scheduled at the max rate of fire, the target will be scheduled at the sustained rate of fire.
   - All massed targets will be scheduled at the sustained rate of fire.
   - It is possible to have a target scheduled at the max rate of fire after a massed target scheduled at the sustained rate of fire, when the total firing time for both targets does not exceed the first three firing minutes of the unit schedule.
   - It is possible to have a single target scheduled at the max rate of fire beyond the first three minutes of a SOF (i.e.; at +20), as long

as the accumulative unit firing time does not exceed the first three firing minutes of the unit schedule.

Table 20. Shift Times Rates of Fire for Various Weapons

Weapon Caliber	Shift Time (Min.)	Sustained ROF (Rds/Min.)	Maximum ROF (Rds/Min.)
105mm	1	3	10
155mm	1	1*	4
203mm	2	.5	1.5
MLRS	3	12	12
All Mortars	0	Varies by model	Varies by model
All NSFS	0	Varies by caliber	Varies by Caliber
Air	0	N/A	N/A

* M198 sustained rate of fire is 2 rounds per minute.

IMPORTANT!!

Editing a unit schedule to add, move or copy targets and increase or decrease volleys may result in targets being rescheduled at a different rate of fire or being unscheduled.

4. Massing Targets in the Schedule of Fires.

   a. Targets that do not require segmentation may be massed based on the fire unit size specified in the Attack Methods Table, when the Attack Methods Table is used to determine the munitions and volume of fire. Additionally, the operator may specify multiple units to fire on a target in the Basic Target Information/Fire and Control window. This data is considered in the schedule of fires calculation at the local OPFAC, but is not sent/transferred with a target list or fire plan.

   b. The schedule of fires calculation segments large area targets using the same segmentation criteria as current mission processing, and schedules fire units to mass on the segmented target. AFATDS will place a volume of fire on each segment of the target based on the guidance. For example:

- The operator specifies “HE/PD 3” for target AA2000 on the fire plan window. AA2000 is a 400 x 200 meter target and AFATDS segments the target into two standard segments of 200 x 200m. AFATDS will attempt to mass two platoon size fire units - one FU firing 3 volleys at one segment and one FU firing 3 volleys at the other segment.

- The operator specifies “HE/PD/3 volleys in the MoE and specifies two platoon size fire units in the method of fire and control. AA2000 is a 400 x 200 meter target and AFATDS segments the target into two standard segments of 200 x 200m. AFATDS will attempt to mass four platoon size fire units - two FUs firing 3 volleys at one segment and two FUs firing 3 volleys at the other segment.

5. Unscheduled Targets. When you calculate a schedule of fires, one or more targets may not be scheduled. The following are the more common reasons a target fails to schedule:

- Target out of range of available fire units (exceeds max range or outside of range fan)
- Target’s mission value fails mission cutoff
- Target’s offset time conflicts with other targets (i.e. not enough fire units are available at the specified offset time). AFATDS will not schedule a target if it cannot be fired at the offset time specified in the fire plan.
- Target is a massed target and there are not enough fire units available. For example, if the required fire unit size is “battalion”, AFATDS attempts to mass fire units to achieve 18 tubes. If there are not enough fire units available to mass a minimum of 12 tubes (AFATDS will accept 2/3 of the desired tube count) the target will not be scheduled.

If a target fails to be scheduled once it has been calculated for a schedule of fires, the operator may view the options review window to see why the target did not schedule. The option review window compares the unscheduled target against the units considered in the schedule of fires. Next to each option is a series of icons which represent certain checks made for that unit option. Under the option will be listed a Y or N which indicates whether the check was passed or failed; blank indicates that the option was not checked or is not applicable. Targets that fail to schedule due to timing problems (e.g. no unit available to fire on the target at the required time) will have a "N" in the time column (column with the clock symbol).

6. Some targets may be scheduled with different munitions and/or quantity than was specified in the fire plan. When AFATDS determines attack options for each target it will first try what you asked for in the fire plan. That munition may not be capable for a variety of reasons:

   - The munition is restricted.
   - Fire units do not have enough of that munition.
   - Fire units do not have enough of a legal fuze for that munition.
   - The munition could not achieve the effects desired (for effects targets).
   - The munition cannot range the target even though the target is within the unit(s) range fan(s).

7. <u>Recalculating a Schedule of Fires.</u> The purpose of the schedule of fires calculation is to provide the operator with the best solution that AFATDS can determine based on the available units, target information, and guidance. If operator is not satisfied with the initial calculation he can change fire plan information (offset times/ranks, munitions etc.) or guidance (AMT, restrictions, mission cutoffs) or the available fire units and recalculate the schedule of fires.

IMPORTANT!!
When a schedule is recalculated all targets are reconsidered, based on updated munitions, offset/ranks, guidance and available units. Units removed from the schedule prior to the previous calculation, must be added to the schedule to be considered.

8. <u>Editing a Schedule of Fires.</u> The operator can edit units schedule to add, copy, move and delete targets from the unit schedule.

   - When you add an unscheduled target to a unit schedule, AFATDS will place it at the end of the unit schedule and leave the munitions blank. It is up to you to enter the desired munitions type and quantity, and change time to fire for the target.
   - When you copy or move a target from one unit schedule to another, AFATDS will place it at the end of the unit schedule. The operator must change the time to fire for the target to move it to the desired place in the unit schedule.
   - AFATDS will tell you when the unit is out of range or the munition is not supported by the unit.

- Targets removed from a unit schedule are added to the unscheduled target list, and may be added to another unit schedule.
- All changes you make during the edit session will be saved back to the schedule of fires when you select OK or UPDATE on the unit schedule window, and will be saved back to the fire plan when you OK out of the schedule of fires, or transmit the schedule of fires from a window selection. If you CANCEL the Unit schedule, the Schedule of Fires window or the Fire Plan window, no edits will be saved.

IMPORTANT!!

When a target is moved or copied from one unit's schedule to another unit's schedule, the firing time is not automatically recalculated for the unit having the target added. If the two units have different weapons, or they are different FS systems, they may have different firing times. The operator needs to edit the schedule of the unit having the target added to change the volleys count so that the firing time is recalculated. Changing the volley count back to the original value is acceptable; it's the act of changing the volley count that triggers the recalculation of the firing time.

9. A schedule of fires can be deleted and a new schedule of fires calculated based on current fire plan data.

Creating/Editing a Schedule of Fire

No.	Action
1.	Open the fire plan with which you want to create or edit a schedule of fires from, or select "Targets | Schedules of Fire", select the schedule to edit, select OK and go to step 3.
2.	Select "Options | Schedule" from the Fire Plan window. The Schedule of Fires window will open with all commanded and supporting units shown.
3.	Remove any units you do not want considered by selecting the unit(s) and then selecting "Options | Remove Units".

No.	Action
4.	Calculate the schedule by selecting "Options | Calculate". After a delay, all targets scheduled will be shown along with the units which are scheduled to shoot them. The number of unscheduled targets are shown at the bottom of the window along with the total number of rounds needed to fire the Schedule of Fire.
5.	To edit a unit's schedule, select the unit and then "Options | Unit Schedule". Otherwise, continue with step 9.
6.	The Unit Schedule window will open with all targets scheduled shown. Targets can be selected and their offset times changed or munitions and volleys changed.
7a.	TO REMOVE A TARGET SCHEDULED. Unit to fire on target must be removed, thus removing unit and placing target on Unscheduled List.
7b.	TO ADD AN UNSCHEDULED TARGET. Return to "Fire Plan | Options | Schedule", then calculate.
7c.	TO MOVE OR COPY A TARGET TO ANOTHER FIRE UNIT, select the target to move or copy, then select "Options | Move | Copy". A list of fire units will be presented; select the fire unit and then OK.
7d.	TO APPLY CHANGES MADE TO THIS WINDOW, select "Update". The Unit Schedule window and the Schedule of Fires window will be updated.
8.	To close the Unit Schedule window, select OK.
9.	At this time you may need to recalculate the schedule in order to assign remaining, unscheduled targets to fire units. If so, add any units necessary by selecting "Options | Add Units" or remove units by selecting "Options | Remove Units". Recalculate by selecting "Options | Calculate". You may also change attack guidance (e.g., FA Attack Methods), delete the Schedule and recalculate a new one.
10.	To save the schedule of fire, select OK. The Schedule of Fires window will close.

10. Printing a Schedule of Fires (SOF).

The operator can print the Schedule Of Fires listing after it is created in AFATDS. The PRINT selection is found in the OPTIONS menu of the SOF window. The listing will be generated in 17 character per inch and portrait format. The SOF listing will include the following information:

a. Schedule Name
b. Start and End Time / DTG
c. Fire Unit Name(s)
d. Target Numbers
e. Firing and Shift Time

E. Sending or Transferring a Target List, Fire Plan or Schedule of Fires.

1. A current or plan-phase situation target list or fire plan can be sent from an AFATDS OPFAC using the SEND... selection on the respective window. The receiving OPFAC automatically adds the targets/fire plans to the current situation (or to the applicable plan-phase). The receiving OPFAC will be notified that the target data was received by the "TGT" icon count field on the Current or Plan Situation Toolbar being incremented. Additionally, the receiving OPFAC will be alerted when a fire plan is received.

Transmitting a Fire Plan or Target List via the Fire Plan window

No.	Action
1.	Open the Fire Plan or Target window that you want to transmit.
2.	Select "Send...". The Send To window will open.
3.	Select the Unit you wish to send the Fire Plan or Target List to, and select OK. The Send To window will close.
4.	The fire plan or target list will be transmitted to the chosen unit. No alerts will be generated.

2. A current or plan situation schedule of fires can be sent from an AFATDS OPFAC using the SEND TO SELECTED... selection on the schedule of fires option menu, or the SEND button on the schedule of fires window.

- When the SEND TO SELECTED option is used, the selected fire unit or FA CP is sent only the portion of the schedule of fires that applies to the selected unit and its subordinate/supporting units.

If the selected unit is an FSE then the entire schedule of fires is sent.

- When the operator selects the SEND button on a Schedule of Fires window, each fire unit assigned on the schedule of fires is sent its respective unit schedule. This SEND option should only be used by OPFACs that have communications with the assigned fire units. Otherwise, failed transmission alerts will occur.

Transmitting a Schedule of Fire via the SEND TO... Option on the Schedule Window

No.	Action
1.	Open the Schedule of Fires window for the Schedule of Fire which you want to transmit.
2.	Select "Options | Send...". The Send To window will open.
3.	Select the Unit you wish to send the Schedule of Fire to, and select OK. The Send To window will close.
4.	The Schedule of Fire will be transmitted to the chosen unit. No alerts will be generated.

Sending Schedule of Fires via the SEND Button on the Schedule Window

No.	Action
1.	Open the Schedule of Fires window.
2.	Select the SEND button.
3.	Unit schedules will be sent to each fire unit on the schedule.

3. A plan-phase target list, fire plan or schedule of fires can be transferred from one AFATDS OPFAC to another using the TRANSFER PLAN functions. The receiving AFATDS OPFAC alerts the operator when plan data has been received and is ready for preview. The preview window does not display target data (It is blank). However, AFATDS automatically places the target list, fire plan and/or schedule of fires in the applicable plan-phase when it is received.

Transmitting a Target List, Fire Plan or Schedule of Fires via the Transfer Plan Function

No.	Action
1.	Select "Situations | Transfer Current".
2.	Select Comm as Transfer mode.
3.	Select the Information Type of Targets.
4.	Select the Schedule of Fires box on the left. All Schedule of Fires will be displayed on the right.
5.	Select those "Schedule of Fires" which you want to send.
6.	Select the Fire Plans box on the left. All fire plans will be displayed on the right.
7.	Select those fire plans which you want to send.
8.	Select Target Box
9.	Select Target Lists
10.	Select Send. The Send To window will open.
11.	Select the unit(s) you wish to send the fire plans and/or Schedule of Fires to and select Send.
12.	The Fire Plans and/or Schedule of Fires will be transmitted. When complete, you will receive an alert and the receiving OPFAC will receive an alert.

4. Munitions specified on the fire plan or in the target method of engagement window is used in the schedule of fires calculation at the local OPFAC. Munitions specified in the fire plan window (or munitions determined by calculating a SoF) are sent/transferred with the fire plan.

5. When receiving a schedule of fires from another OPFAC, all units in the schedule of fires must exist in the appropriate plan or current situation for the schedule of fires to be successfully received and stored. If a schedule of fires is received at an OPFAC for a fire plan that is currently being displayed, selecting OK on the fire plan will cause the newly received schedule of fires information to be overwritten by the displayed fire plan information.

IMPORTANT!!

When a schedule of fires that includes targets that have been segmented is sent/transferred, target segment aimpoints are <u>NOT</u> sent. Only the target center location and size is sent/transferred.

F. <u>Executing a Fire Plan</u>. Selecting the EXECUTE button causes the fire plan targets to be processed through current mission processing like all other fire missions. Executing a fire plan executes the associated schedule of fires if a schedule of fires is present.

1. A fire plan with an On-Call start time should be <u>ACTIVATED</u> before it is executed. When an on-call fire plan is <u>ACTIVATED</u>, AFATDS will update the on-call relative start and end times to absolute times based on the current system time. For example, fire plan start time is +20, current system time is 1200hrs. The updated absolute time will be 1220hrs.

2. When a fire plan is <u>EXECUTED</u>, the operator is immediately prompted by AFATDS to select whether or not the fire plan targets are to be pre-empted by other targets. Selecting NO assigns a mission value of 100 to all fire plan targets. This insures that the fire plan targets are not pre-empted by targets of opportunity unless they are immediate or priority targets. Selecting YES retains the mission values calculated based on the situation guidance, and allows targets of opportunity with a higher mission value to pre-empt the fire plan targets. If a fire plan target cannot be fired in time to meet its TOT, AFATDS will recommend that the target be denied.

3. Targets are processed as unobserved TOT missions, based on the fire plan start time and target offset times specified in the fire plan/ schedule of fires. The target offset is the time that the first rounds land on the target (the TOT).

4. Targets are processed through target filters, and if they fail one or more of the filters they will be recommended for deny at the operator IP. If intervention is not set for the operator to view denied targets, targets failing filter or capability checks will be placed in the mission denied ("thumbs down") section of the mission toolbar.

5. Targets that require coordination. AFATDS <u>always</u> checks targets for FSCM violations during attack analysis even if coordination on that target was previously overridden by the operator from the target list.

This is for safety reasons since a coordination request approved two hours ago may no longer be valid due to changes in the tactical situation. If AFATDS determines a coordination requirement it will automatically generate and send the coordination request if intervention criteria is not set to view coordination requirements. If intervention criteria is set to view coordination requirements, these targets will appear at the intervention point and the operator may "view/override" the coordination requirement before it is sent. After the coordination requirement is sent, the operator may still override the coordination through the mission toolbar coordination icon (handshake symbol).

6. If the fire unit operational status or munition on hand status has changed from the status used to calculate the schedule of fires, a different attack option may be generated to reassign the target another fire unit, change the munitions or deny the target if no capable options are available.

7. Upon receipt of rounds complete from the BCS or FDS, the fire unit AFATDS will generate a MFR and send the MFR through the mission chain to the OPFAC that executed the fire plan/ schedule of fires. The receiving OPFAC will be notified that a MFR was received by the "MFR" icon count field on the Current Situation Toolbar being incremented. The MFR is then forwarded to that OPFACs supported unit and to other units specified in the OPFAC mission info routing guidance.

8. When a fire plan/ schedule of fires that includes segmented targets is executed at the FA CP, that calculated the schedule of fires, fire orders are generated and sent to fire units that include the assigned segment aimpoint and the shell, fuze and volleys/rounds specified in the schedule of fires. However, execution the fire plan/ schedule of fires at the FA CP may result in massed targets being reassigned to different fire units than were originally assigned in the schedule of fires.

9. When a fire plan/ schedule of fires that includes segmented targets is executed at fire unit level, all fire units assigned to the massed/segmented targets will fire on the target center locations sent in the schedule of fires. If the schedule of fires is executed by the fire unit AFATDS, each fire unit will increase the volume of fire to account for the target size, as if it is the only unit attacking the target. This results in a higher number of rounds/volleys than indicated on the schedule of fires. If the schedule of fires is sent to the fire unit BCS and then executed at the BCS, the fire unit will fire on the target

center location with the volume of fire specified in the schedule of fires.

IMPORTANT!!
Execute the fire plan prior to the established start time to allow sufficient time to process targets and transmit OTFs/FOs to meet the TOTs.

Executing a Fire Plan

No.	Action
1.	Select "Targets | Fire Plans | Edit".
2.	Select the fire plan for the Schedule of Fire to execute, and select OK. The Fire Plan window will open.
3.	Ensure that the Start Time and End Time is Actual. If they are ON Call, set the On Call time appropriately and then select Activate. If they are already Actual but are wrong, you can select the On Call radio button, change the times and the Activate the On Call times.
4.	Select the Execute button. The "Confirm Target Values window will open asking "Allow other targets to pre-empt fire plan targets?"
5.	To pre-empt targets, that is, to allow the fire plan to have priority over all As Acquired mission, select NO. Otherwise, say YES. Note that priority and immediate mission will have priority over any fire plan missions.
6.	The fire plan will be executed. If intervention is ON, all targets meeting the intervention criteria set will be stopped for manual control.

G. Implementing Fire Plan Data from planning to current. A schedule of fires calculated in a plan situation cannot be implemented into the current situation. This is to preclude execution of a schedule of fires that was based on a plan situation fire unit status and positioning. A plan situation fire plan must be implemented to current and a schedule of fires calculated based on the current unit status and positioning.

Air Support Overview

A. Air Support Planning & Execution.

AFATDS provides automated assistance to assist the operator in managing Air Support in both the preplanning and execution phases. The basic tool used by the operator is the Air Support List (ASL). The ASL contains air missions for a given day in the future (Preplanned ASL) or those air missions that are going to be flown during the current air day (Current ASL).

As with target lists and fire plans, multiple ASLs may exist in a plan-phase. Multiple ASLs may also exist in the current situation. It is recommended (for operator convenience) that your preplanning of air support be done in the current situation. The basic technique is rather simple; Create an ASL (in the current situation) for each future air day and one for the current situation. As an example, consider the Division FSE TAC. This OPFAC is planning for air support while currently executing air missions. The current time is 021230zNov98. The Division FSE's ASLs in the current situation are:

ASL:	Div TAC 5Nov98
Start Time:	050000Nov98
Stop Time:	052359Nov98
Reason:	This is the ASL that the division is planning & coordinating for operations 3 days from now. Missions on this list have not yet been submitted to the air component and the AFATDS air planners are now consolidating ("Racking") subordinate requests into the Division ASL for 5 November.

ASL:	Div TAC 4Nov98
Start Time:	040000Nov98
Stop Time:	042359Nov98
Reason:	This is the ASL that the division is planning & coordinating for operations 2 days from now. Missions on this list have been submitted for approval and the Division FSE is waiting for the Air Tasking Order (ATO).

ASL:	Div TAC 3Nov98
Start Time:	030000Nov98

Stop Time:	032359Nov98
Reason:	This is the ASL that the division is planning & coordinating for tomorrow's (3 November) operations. An ATO has been received and this list contains a complete list of the approved and denied air support requests for the 3rd of November .

ASL:	Div TAC 2Nov98
Start Time:	020000Nov98
Stop Time:	022359Nov98
Reason:	This is the ASL that contains air missions scheduled to be flown on 2 November. This list also contains immediate ASRs submitted through the Division FSE. This is the list used by the operator to track the status of air missions that are to be executed today.

As time marches on, today's ASL (2 November) will no longer be needed. At Midnight on the 2nd of November, AFATDS begins to use the ASL: "Div TAC 3Nov98" as the current ASL. The Operator also begins his first efforts to create ASL: "Div TAC 6Nov98" to continue the air planning. Air Support Planning (like all other aspects of fire support) is a continuous process. This section describes procedures for managing preplanned and immediate air support using AFATDS.

B. Preplanned Air Support.

Preplanned Air support functions in AFATDS allow each echelon to develop air support requests (ASRs) for a specific "Air Day" and send them up the request chain (ultimately to the USAF or USMC Air Component) for approval via the Air Tasking Order (ATO) process. Each OPFAC in the chain is responsible for consolidating and deconflicting subordinate OPFAC ASRs. The steps to accomplish the preplanning task are listed below:

1. Setup Preplanned Air Mission Address. In order for AFATDS to know who to send your ASRs to, you must enter the address to whom your preplanned ASRs are to be sent. To do this, open the "Air Mission Routing" window (Current situation menu bar -->Mission Processing --> Mission Info Routing --> Air Mission Routing). Enter the address for your preplanned ASRs in the appropriate field. For example, if you are a Bde level FSE/FSCC then your address would normally be Division FSE. If you are the OPFAC that is directly interfacing with the air component then your address would be the CTAPS or TBMCS unit that is supporting your operations.

2. Setup Communications with CTAPS/TBMCS.

   a. Physical Connection: Ensure your OPFAC primary LAN (for UCU) and secondary LAN (for CCU) is connected to the CTAPS's/TBMCS's Primary LAN. To verify connection use the "pinging" function.

   b. Gather Data: Have the CTAPS/TBMCS operator provide you with the following information:

      - Your OPFAC's IP address and Host Name.
      - The CTAPS's/ TBMCS's IP address, Host Name and User ID.

   c. Establish CTAPS/ TBMCS Unit in your Database: Ensure the CTAPS unit is entered in your Master Unit List (MUL) and that its device type is "CTAPS" or "TBMCS" as appropriate.

   d. See the "Communications: CTAPS/TBMCS Communications" section of this notebook to setup communications with CTAPS/TBMCS.

3. Create and manage the ASL.

   - The Air Support List (ASL) contains all air missions for a given OPFAC (e.g. 3 Bde FSE) for a given Air Day (e.g. 1-2 November, 1998). The ASL is the AFATDS operator's primary tool for managing air support for the commander. To create a new ASL select the "Targets" -- "Target Lists" -- "New ASL" from the situation menu bar. You will be prompted to enter the ASL name and start/stop time for the air day. Once this is done click the "Create ASL" button on the window. You may now enter individual ASRs. There are 7 air mission classifications

   that may be contained on an ASL:

      - Close Air Support (CAS)
      - Air Interdiction (AI)
      - Reconnaissance (RECON)
      - Electronic Warfare (EW)
      - Airdrop
      - Assault Support (Asslt Spt)
      - Medical Evacuation (Medivac)

   - All OPFACs should be told the specific DTG that constitutes an Air Day (e.g. 010001zNov98 to 020000zNov98). The OPFACs desiring to preplan air missions create an ASL (usually in the current situation) with a start and end time corresponding to the given Air Day. The OPFACs should name their ASL using their OPFAC name (this is so the Higher HQ can easily identify ASLs as they are received from subordinates). For example, the 3 Bde FSE would name its ASL “3 Bde 01 Nov 98” while the Div FSE would use “DIV FSE 01 Nov 98”. The “ASL” indication is automatically appended by AFATDS so there is no need to use “ASL” in the name. You should coordinate the Start & Stop times for a given Air Day with the air component representative since It is important that the ASL correspond with the ATO cycle.

NOTE!

The ATO is always built one minute short of 24 hours at CTAPS. Example: 010600ZJan99-020559ZJan99.

- Use the “Select fields” option under the “View” menu item on the ASL window to tailor the ASL display. It is recommended that you select air mission related data fields (like “Air Priority”, Air Status”, “originator”) for display on the ASL. Once you have the proper fields displayed, you can use the sort capabilities to rapidly view information. For example, if you have an ASL with 100 missions and you want to see the most important (highest priority) then sort by “Air Priority”. This is similar to the “Stacking” functions that are used by the air components where they sort their ASR lists to view the most important missions first.

- Use the “Approved ASL” option under the “View” menu item on the ASL window to view a single list containing only those air missions that have been approved (this view is the equivalent to the “Air Status Chart” or “ASC”).

- Use the “Denied ASL” option under the “View” menu item on the ASL window to view a single list containing only those air missions that have been denied (this view is equivalent to the “Unsupported Air Target List” or “UTARL”).

- An ASL search and sort capability allows for the search and sort of any field that is displayed on the ASL window. A pull down or cascading window does not exist for this function, instead the operator places the cursor on the displayed field and double clicks the right mouse button to display the sort or search function is ascending or descending order.

- Verification Time. You can set a time (in hours) that you want AFATDS to alert you before an Air Mission is to be flown. To do this, Select the “Verification” option on the “Mission” menu item on the ASL.   You may specify two alert times on the window. For example, the operator sets alert 1 to 8 hours and alert 2 to 4 hours. ASR # AAA2034 has a start time of 121800zNov98. At 121000ZNov98 the operator will be notified that AAA2034 is 8 hours from execution. Another alert will come up at 121400ZNov98. The purpose of this capability is to let the operator know about impending air missions so he can modify or cancel them as necessary. The verification alert will be generated at the OPFAC responsible (the OPFAC that created the mission) for the mission. The operator can acknowledge the alert (which leaves the mission unchanged) or, if the operator feels the mission is no longer needed, he may cancel (deny) the air mission. This will send a cancel notification up the air request chain.

The ASL window will display two colored columns labeled Ver1 and Ver2. These fields will contain one of the three following colors based upon the following rules.

- If the data for the Air Mission does not contain a "mission verified" indicator and the current time is more than X hours before the air mission start time (where X is the "prior to" alert time in the air mission notification window), then the color column will be white.
- If the data for the Air Mission does not contain a "mission verified" indicator and the current time is less than or equal to X hours before the air mission start time, then the color will be yellow.
- If the data in the Air Mission contains a "mission verified" entry, then the column color will be green.

IMPORTANT!!

The alert times you set in the verification window apply to all ASLs at your OPFAC.

- Air Mission Status. In Air mission planning, there are four different states that AFATDS maintains for each air support request (ASR) on the Air Support List (ASL). The operator must understand what these states mean in order to effectively manage air support. It is recommended that the operator ensure that the ASL display always has the “Air Mission Status” field displayed:

- Created. This indicates that the ASR has been established at the local OPFAC (either by the operator or due to receipt of an ASR from another OPFAC). Any ASR in a created status is in the local OPFAC's database. Any ASR in this status has not been sent by your OPFAC to the “Preplanned” address in the Air Mission Routing window or, if the ASR was previously sent, it has been edited.

- Requested. This indicates that the ASR has been transmitted your “Preplanned” air mission address. When your OPFAC transmits an ASR in a "Created" status - That ASR's status at your OPFAC automatically changes to "Requested". When that ASR is received at the destination OPFAC - That ASR's status at the receiving OPFAC is "Created".

- Confirmed. This indicates that the ASR was "approved" by an AFATDS operator or was contained on the ATO originated by CTAPS/TBMCS for the related "Air Day". Note that the AFATDS operator can "approve" (confirm) ASRs (this will allow you to conduct air planning without a CTAPS/TBMCS if it ever comes to that). Note that in the "normal" operational thread, the AFATDS operator will simply forward on (ultimately to CTAPS/TBMCS) ASRs that he feels are "worthy" air missions.

- Denied. This indicates that the ASR was "disapproved" by an AFATDS operator or was not contained on the ATO originated by CTAPS/TBMCS for the related "Air Day". Note that in the "normal" operational thread, the AFATDS operator at one of the intermediate OPFACs (between the ASR originator and the CTAPS/TBMCS) will deny ASRs that he feels are not "worthy" air missions.

• If your OPFAC is an “intermediate” OPFAC (in other words you have subordinate units sending their ASRs to you for approval) then you should consolidate their ASRs on your ASL. For more information on how to do this see paragraph 7 below.

• On the ASL window under the option of "File" is an entry of Verification. This entry will open the CAS/AI alert criteria window which allows the AFATDS operator to determine whether to receive air mission verification alerts for CAS and AI missions.

The operator can also determine the time interval that alerts will be posted.

- Hours prior 1 = number of hours before mission start time that the first verification alert will be posted to the AFATDS OPFAC.
- Hours prior 2 = number of hours before mission start time that the second verification alert will be posted to the AFATDS OPFAC.

4. Create Individual ASRs - General. Normally each OPFAC is allocated a certain amount of sorties to plan. As a matter of SOP, you should preplan air missions to “use up” the number of allocations you have for a specific Air Day. It should be noted that a sortie is “one take off and landing” by one aircraft. Often, air support assets like to fly with two or more aircraft for a given mission. Keep this in mind when requesting air missions. For example, if you are allocated 10 CAS or AI sorties, that may really equate to 5 missions. Consult your air liaison officer for specific guidance on this aspect.

5. Create Individual ASRs - Specific.

   - First make sure you set up an ASR numbering block (for example ABC1000 - ABC2000).

   - Create ASR - method one: On the ASL under “Target” select “New” and pick the Air mission classification (CAS, EW, RECCE etc.). AFATDS will open the Air Mission Info window and automatically give the mission an ASR number.

   - Create ASR - method two: On the ASL open a target list by double clicking on the appropriate line. Once the individual targets are displayed you can select them and then (using the right mouse button) bring up a "Copy" or Merge" option. The target will be added to your ASL with a mission classification of "Air Interdiction". <u>IMPORTANT</u>: <u>When you use this technique, you will need to open the ASR you just created in order to verify the mission location and mission start time are correct</u>.

   - Point and Click allows the operator to choose targets from numerous places and nominate them as air targets. When nominating from the map, highlight the target, then depress the right trackball button to get a pull down menu. On the pull down menu there is an entry, Nominate as Air Target. At this point you can select the ASL on which to enter the target. The point and click capability (Nominate as Air Target) is available at the following locations: MIDB databases, Map pulldown, Target List windows under the Target pull-down (On-Call, Planned, Inactive), and Enemy unit icon, if that unit has been added to a target list.

- Make sure to fill in the required data on the ASR form.   These missions should be “Preplanned” (i.e. scheduled to be executed in the future) rather than “Immediate”. The mission start time must be in the time window of the ASL upon which you are adding the ASR. The mission location must also be entered.

- “On-Call” ASRs: An on-call ASR is used when you want to plan for an air mission during a specific period of time on a given Air Day.   Once approved, the aircraft associated with the mission are placed into an “Alert” status (in a Ground or Airborne posture) and wait until they are told to “Execute” the mission. To make a preplanned On-Call air mission, on the ASR window select a “type” that contains the word “alert” (such as “ground alert attack” or “Airborne Alert Close Air Support”). You may optionally specify a specific reaction time you want the aircraft to maintain. For example, if you enter “10 minutes”, you are requesting that the On-Call aircraft be ready to depart to attack the target within 10 minutes of being told to execute the mission. To make the alert time field editable, select the “Time, Hours” or “Time, Minutes” option on the “Alert Status” option menu.

- “Scheduled” ASRs: A scheduled ASR is one that has a “Type” that does not contain the word “Alert”. Scheduled missions are typically executed at a specific time (narrow “Start”/”Stop” time window).

- Once you create an ASR it will be in a “Created” state. This simply means that you have not sent that ASR up for approval.

6. Transmitting the ASL.

- Once you have created ASRs for the “Air Day”, you are ready to send the ASL to your higher Headquarters for review. To do this, Select “Send...” button on the bottom of the ASL window. When the unit list opens up, pick the same unit that you entered for preplanned air missions in the “Air Mission Routing” screen. The receiving OPFAC will be notified that the ASL was received by the "ASL" icon count field on the Current or Plan Situation Toolbar being incremented.

- Once you have successfully sent the ASL, all of your ASRs that were in a “Created” status will now show “Requested”. This tells you that the ASR has been sent by your OPFAC for approval.

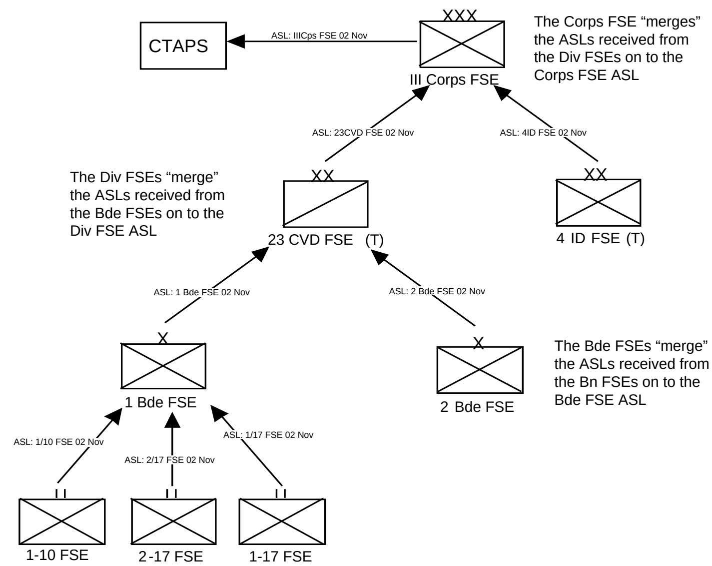
- Now that you have sent the ASRs, you are simply waiting for your higher headquarters to process your requests. Normally, you will eventually (depending on the ATO cycle) receive updates to your ASRs telling you whether they have been denied.

- You may also send “information copies” of your ASL to other OPFACs (like an adjacent FSE). To do this select the appropriate unit after selecting “Send...” from the ASL. AFATDS will not update the status of the ASRs to “Requested” until you send the ASL to the unit identified in the Air Mission Routing Window for preplanned ASRs.

7. Consolidation of ASRs into the Intermediate OPFAC’s ASL.

- As a matter of standard procedure, if your OPFAC is an intermediate OPFAC between subordinate units and the supporting Air Component (e.g. CTAPS), then your OPFAC is responsible for consolidating subordinate ASRs onto one ASL for a given Air Day. To do this, create your ASL for the Air Day (as discussed above). On the side of the ASL window, look for your subordinate unit’s ASL that corresponds to the same Air Day as your ASL. Select that ASL, click the right mouse button (a "Copy" and "Merge" option will be displayed), select the "Merge" option, and select the “<u>MERGE</u>” arrow. <u>DO NOT USE THE “COPY” OPTION WHEN YOU ARE CONSOLIDATING ASLs.</u> The merged ASL is no longer necessary so AFATDS will delete it. AFATDS will remember which ASR belongs to which OPFAC. The subordinate ASRs are now on your ASL. This function is commonly referred to as “Racking” the ASRs.

- In the ASL display you can use the “View --> Select Data Fields” option to display the “Originator” field on the ASL. The Originator of an Air Mission is who AFATDS will send updates to when the ATO is processed. The diagram below summarizes the consolidation process.



8. Reviewing Your Preplanned ASL.

- Once you have finished the initial creation of the ASL for an Air Day (you added your own ASRs and merged in the subordinate unit ASLs), you should review your ASL for consistency and correctness. Again, the “Select Data Fields” option can be used to tailor the ASL display. Use the sort capability under the “List” menu item to sort the ASL for easier review. This will assist you in “Stacking” the ASL for a view of the high priority ASRs. There are many sort criteria available for all target lists. The criteria most often used for sorting ASLs include:

  - Target Number. The AFATDS target number associated with the mission.
  - ASR Number.
  - BE Number.
  - Air Mission Classification (CAS, RECCE, MEDIVAC etc.).
  - Air Mission Status (Created, Requested, Confirmed, Denied).
  - Air Mission Priority (A - Z).
  - Air Mission Precedence (0 - 4).
  - Originator (this is the unit that sent you the air mission).
  - Request Type (Immediate, Preplanned).

- Start Time (this is the time the mission is scheduled to fly or, for on-call missions, the time the aircraft are ready to be called to execute a mission).
- Final Control (agency that will control the aircraft).

• In general, your task at this point is to review the consolidated ASL for the given Air day to determine what air missions you want to forward to the next higher OPFAC. Missions that you do not want to forward should be denied at this time. To assist in your decision making, use the sorting functions discussed above (this will group similar ASRs together). You may also run a duplication check to see if any missions are planned for the same location.

> **IMPORTANT!!**
>
> **When you run the duplication check on an ASL, AFATDS will list the target numbers (not ASR numbers) that are duplicates of each other based on the target location and the duplication guidance. Do not use the "Combine" option on this window. Instead, if you desire to deny one or more of the duplicate air missions, return to the ASL and place them in a "deny" status.**

• As you review the ASL you have several options for each Air mission. Typical actions include:

- <u>Deny the ASR</u>. If you have determined that you do not want to forward one or more ASRs up to the next OPFAC then you should select the ASR(s) on the ASL and then select the "Disapprove" option under the "Mission" menu item. Once you deny an air mission, AFATDS will automatically change the mission state to "Denied" and will send the deny message back to the originator (OPFAC that sent you the mission). If you want the originator to see why you denied a particular ASR, you may enter text in the "Comments" field of the ASR before you select "Disapprove".

- <u>Delete The ASR</u>. You may delete ASRs that you created at any time, however, you should never delete another OPFAC's ASR unless the status is "denied" or "completed". This is because the OPFAC that submitted the ASR will not be told you deleted his ASR. When you delete an ASR AFATDS will not automatically send a deny message back to the originator. You may optionally enter “reason for deny” text in a window that AFATDS will display when you select the delete option – but this will update only your database.

- Edit the ASR. You may change mission parameters (e.g. type of aircraft, enemy ADA threat) as the situation dictates. It is not a good idea to change mission location or mission execution time information on other OPFAC’s ASRs without first coordinating with those OPFACs.

- Send the ASR. When you are viewing an individual ASR, you may select the “Send” button. For preplanned ASRs, this will send the ASR to the OPFAC identified in the “Air Mission Routing” window for preplanned requests. Use of this option is only recommended when you have already submitted your ASL but now have modifications to an existing ASR. Using "Send" is also recommended if you create a new ASR on an ASL that has already been sent.

- Approve the ASR. Normally approval of an ASR is done by the Air component. If your OPFAC is functioning as the Air Component (i.e. you are not using CTAPS or TBMCS), then approval of ASRs is your responsibility. To approve ASR(s) select the “Approve” option under the “Mission” menu item. Once you approve an air mission, AFATDS will automatically change the mission state to “Confirmed” and will send the approval message back to the originator (OPFAC that sent you the mission).

• Once you have completed review of the ASL, select the “Send...” option on the ASL window to get the requests to the next OPFAC in the Air Mission chain.

9. Modifying ASRs after they have been requested. You may edit a preplanned ASR at any time. Once you edit the ASR, it will return to a “Created” status. Standard procedure is to use the “Send” button on the ASR window after you complete the updates. This will automatically change the status at your OPFAC back to “requested” and send the updated ASR to the unit specified in your Air Mission Routing. The mission must go through the approval cycle again since the mission data has been altered.

NOTE!

Do not deny or delete ASRs after they have already been requested: The following situation may be encountered if an ASR is deleted by the originator after it has already been created and forwarded to the next OPFAC in the air mission chain. When the ASR is deleted, the originating OPFAC notifies the next OPFAC that the mission was deleted. Next OPFAC then 'denies' and 'deletes' the ASR. Because the mission originated at another OPFAC, AFATDS will automatically send the updated ASR data to the originator. When the update arrives at the originating OPFAC, the ASR no longer exists there. AFATDS treats this as a 'new' ASR and places it in a 'created' state. The correct way to delete a mission in a 'requested' or higher state is to have the OPFAC at the 'top' of the request chain deny the mission (the OPFAC at the 'top' is the first that shows the mission in a 'created' state). This will automatically change the ASR status to 'denied' at all OPFACs in the request chain. Then the mission can be deleted at all OPFACs. If an operator requests a mission and then wishes to delete it, he should send a FREETEXT or voice message to the next OPFAC in the chain, requesting that the mission be denied. If the next OPFAC in the chain has the mission in a requested or higher state, it relays the message up the chain. When it gets to an OPFAC where the mission is still in a 'created' state, the operator there denies the mission, and the updated status is passed down the chain. When the other operators in the chain see that the mission status is 'denied', then they know that the other OPFACs in the request chain have been informed, and the ASR can be deleted.

10. Receiving The Air Tasking Order. The OPFAC interfacing with CTAPS/TBMCS will receive an ATO containing the ASR numbers that have been approved for a given air day. The receiving OPFAC looks at the ATO time window (in the ATO message) and compares that against all of the preplanned ASRs at the OPFAC. Any preplanned ASR that has a start time in the ATO window will be updated as follows:

- If the ASR's status on the ASL is "Requested" and the ATO contains this ASR then the status is updated to "Confirmed".
- If the ASR's status on the ASL is "Requested" and the ATO does not contain this ASR then the status is updated to "denied".

- If the ASR's status on the ASL is "Confirmed" the status is left unchanged regardless of whether the ATO contains this air mission or not.

- If the ASR's status on the ASL is "Denied" and the ATO contains this ASR then the status is updated to "Confirmed".

- If the ASR's status on the ASL is "Denied" and the ATO does not contain this ASR then the status remains "Denied".

NOTE!

The time frame for the ATO and ASL must match exactly. Example: if the ATO air day start and stop window is 070600ZFeb99-080559ZFeb99 then the ASL must match this time frame exactly in order for the ATO to be parsed by AFATDS. If the ATO received from the CTAPs system is not in USMTF format, AFATDS will not parse it.

11. Disseminating ASR Status Updates. When AFATDS receives updates to an Air Mission's status (either through receipt of an ATO or due to operator action), AFATDS will automatically send a status update to the OPFAC from which the mission was received. As an example:

- The Div FSE has 10 missions on ASL "Div FSE(T) 02Nov". These ASRs were originally submitted to the Div FSE by the 1st & 2nd Bde FSEs. The Bde FSEs received them from their Bn FSEs.

- The time period of the ASL is 020001-030000 November.

- An ATO (covering time period 020001-030000 November) is received.

- The Div FSE updates the status of each ASR that is on the ATO to "Confirmed". Each ASR that is not on the ATO is updated to "Denied"

- The Div FSE sends the status updates on the targets submitted by the 1st Bde FSE to 1st Bde FSE. It separately sends the status updates on the targets submitted by the 2nd Bde FSE to 2nd Bde FSE.

- The Bde FSEs send status updates on the targets submitted by each Bn FSEs to the applicable Bn FSE.

12. Execution & Completion of Preplanned Air Missions.

- Approved Preplanned missions are flown at the time specified in the ASR. There are no specific tasks required by the AFATDS operator to execute the mission once the mission is approved. The operator at each OPFAC responsible for integration of Air Support into the maneuver operation should be monitoring the ASL to ensure the missions are still required as planned. As time passes, a preplanned ASL will eventually be covering the current time. When this happens it is recommended that the ASL be closely watched to monitor missions. Some of the following actions may be required:

  - Diverting. You may divert a "confirmed" preplanned CAS/AI mission (that has not yet been completed) on an ASL that is currently effective. Select the "Divert" option under the "Mission" menu item on the ASL.

  - Editing. You can edit air missions on the ASL that are currently effective. Remember, the mission will return to a "created" status.

  - Completing. The CTAPS device cannot tell AFATDS when a mission has been completed. If you are working with a CTAPS, once you have knowledge that a mission has been flown - change the mission state to "completed". Do this by selecting the "Completed" option under the "Mission" menu item on the ASL. The TBMCS can tell AFATDS about a completed air mission by sending the "Mission Report" or "MISREP message. This will update the mission status automatically to "completed" and forward this update down the mission chain to the originating OPFAC.

- Immediate Air Missions on the ASL. When an ASL's start/stop time window covers the current system time - that ASL is considered the "CURRENT" ASL. The Current ASL is where AFATDS will place all air missions that are "Immediates".

13. Example of Air Mission Planning thread.

- 3 Bde FSE AFATDS operator creates an ASL for a given "Air Day" (example - "ASL 3 Bde - 1 May" - Time period: 010000zMay98 to 012359zMay98). Operator then creates ASRs (based on his sortie allocation in the OPORD) on the ASL (these will be in a "Created" status).

- 3 Bde FSE Operator completes his ASRs and then uses the "Send" option to send the ASL to the OPFAC previously defined in his "Air Mission Routing" guidance. The "Send" option will send all ASRs that have a "Created" status. The ASL at the 3rd Bde will now have all of the ASRs on the "ASL 3 Bde - 1 May" list in a "Requested" status.

- Operator at the next OPFAC (23 Div TAC FSE) has also created his own ASL (example - "ASL 23 Div TAC - 1 May" - Time period: 010000zMay98 to 012359zMay98). The Div TAC operator will "merge" ASL data received from his subordinates onto his ASL. This allows him to work with one ASL list for a given Air day. The Div TAC operator now reviews his ASL (it contains the ASRs he created as well as the ASRs submitted by his subordinates - like the 3rd Bde). During the review activity, the operator can run duplication checks and perform subjective decision making and deny ASRs that he does not feel are necessary.

- The 23 Div TAC operator sends his ASL to the Corps FSE (OPFAC interfacing with CTAPS/TBMCS). The Corps FSE operator merges the Division ASL with the Corps ASL (example - "ASL Corps FSE - 1 May" - Time period: 010000zMay98 to 012359zMay98). The operator reviews the consolidated ASL and determines which ASRs will make the "final cut". The Corps ASL is then sent to CTAPS/TBMCS.

- CTAPS/TBMCS produces an ATO for the time period: 010000zMay98 to 012359zMay98. The ATO is sent to the Corps FSE. The Corps FSE AFATDS will place a copy of the entire ATO in the "ATO file" at his OPFAC (the ATO file is the same file used in A97 - it allows the operator to review what the CTAPS/TBMCS actually sent). AFATDS will automatically process the ATO by matching up the effective period in the ATO with the appropriate ASL. Once the ASL is determined, AFATDS will automatically update the status of each Air mission on the ASL. If a given ASR (determined based on the ASR #) is on the ASL and the ATO that ASR's status is updated to "Confirmed". If a given ASR is on the ASL but not in the ATO, that ASR's status is updated to "Denied".

- Once the OPFAC interfacing with the CTAPS/TBMCS has processed the ATO, AFATDS will automatically send the updated ASRs back down the original request chain. The Corps FSE would send the ASRs (with the updated status) that were submitted by the 23 Div TAC back to the 23 Div TAC (e.g. the 23 Div TAC would not be sent ASRs that the Corps received from the 44 Div FSE).

- The 23 Div TAC receives its updated ASRs from Corps FSE (note that the ATO was not sent to the Div TAC - only those ASRs he submitted). AFATDS at the 23 Div TAC automatically updates the air mission status for each ASR received and automatically sends updated ASRs to the originators.

- 3 Bde FSE receives the updated ASRs for the missions he submitted.

C. Immediate Air Support.

Immediate Air support functions in AFATDS allow each echelon to develop Immediate Air Support Requests (ASRs) and send them up the request chain for approval (ultimately to the USAF or USMC Air Component responsible for responding to the air requests being currently executed). Note that the final address for the Immediate missions (e.g. ASOC) is often different than the address for preplanned missions (AOC). Each OPFAC in the chain is responsible for monitoring the Current air support situation at all times. Your OPFAC should always have an ASL created in the current situation. This ASL should have a start/stop time that includes the current system time. As your preplanned ASLs become effective (in other words the current system time has passed the start time for that ASL), you use them to also manage your immediate missions. There should never be two Current ASLs with overlapping times.

1. Setup Immediate Air Mission Address(s). In order for AFATDS to know who to send your immediate ASRs to, you must enter the address to whom your ASRs are to be sent. To do this, open the "Air Mission Routing" window (Current situation menu bar -->Mission Processing --> Mission Info Routing --> Air Mission Routing). Enter the "Action address" for each type of immediate ASR in the appropriate field. In some situations, the address for a Medivac, for example, would be different then the address for a Recon mission. If you are the OPFAC that is directly interfacing with the air component

then your address would usually be the CTAPS or TBMCS unit that is supporting your operations.

> **IMPORTANT!!**
>
> **If your OPFAC is an FSE/FSCC you should also specify the unit that is to receive your immediate CAS/AI requests in the FS Attack Parameters guidance under the "Air" FS system.**

> **IMPORTANT!!**
>
> **In order for AFATDS to correctly process immediate ASRs through attack analysis, you must have an entry in the "Air Mission Routing" for Immediate CAS & AI. If you do not do this, you may not get a capable Air attack option and the intervention point will display "deny mission insufficient unit data" as the recommendation.**

2. Setup Immediate Air Mission Intervention. AFATDS allows you to intervene on Immediate missions processed by your OPFAC. To indicate that you desire to intervene, select the check box on the "Air Mission Routing" form. The Intervention for Immediate Non-Fires air missions such as "RECCE", "EW" etc will be via the Active Mission Toolbar. The Intervention for Immediate Fires Air missions will be at the "normal" mission processing intervention point on the Mission Toolbar.

3. Setup Immediate Air Mission Info Routing. AFATDS allows you to specify an Information Address for Immediate CAS & AI missions. This allows your OPFAC to send out two copies of the Immediate Fires mission (one to the "Action Addressee" and one to the "Info Addressee"). This is a useful tool when it is desired to get the Immediate mission up the chain as soon as possible while still keeping the intermediate OPFACs informed. An OPFAC that receives an "Info copy" of an ASR will see it appear in the mission toolbar (the recommendation field will indicate that this is an "Information Copy" of an air request). If the Info Addressee feels the mission should proceed, he doesn't have to do anything (just "OK" the Intervention Point window). If he feels the mission is not a good

idea he can "Deny" the mission (which will send a "Deny ASR" message back to the originator and also to the Info Addressee's Action Address for CAS/AI missions).

For example, the 3 Bde FSE desires quick reaction on his immediate Fires ASRs. He sets the "Action Address" to the ASOC (OPFAC interfacing with the USAF) but sets the "Info Address" to the Division TAC FSE. This setup allows the mission to get up the chain directly while still keeping the higher HQ appraised (and involved) in the process.

4. Setup communications with CTAPS/TBMCS. This is the same procedure described in the Air Support planning discussion earlier in this section.

5. Immediate "Non-Fires" Air Missions.

   - To initiate Immediate ASRs for the non-fires missions (Recon, Electronic Warfare, Airdrop, Assault Support, Medivac), simply create a new ASR on the Current ASL and pick the appropriate mission classification. When you click "OK" on the ASR form, AFATDS will automatically send the request to the Action Address for the mission classification you selected. The Mission will have a "Requested" status.

   - If you had set up intervention, the mission will appear in the mission toolbar for your approval. AFATDS does this (even though you just initiated the mission) because the final authority for allowing any air mission to progress from your OPFAC is the mission processing Duty (which may or may not be at your workstation)**.** Approve the mission at the intervention and it will be sent.

   - If your OPFAC receives a request for an immediate non-fires air mission, AFATDS will add the mission to the current ASL and, if Air mission intervention is enabled, alert the operator that the mission was received. If intervention is not on, or you accept the air mission at the intervention, AFATDS will send the ASR to the action addressee based on the classification of the mission. If you do not approve the mission at the intervention, AFATDS will send a deny message back to the requester.

6. Immediate “Fires” Air Missions.

- To initiate Immediate ASRs for the fires missions (CAS or AI), simply create a new ASR on the Current ASL and pick the appropriate mission classification. When you click “OK” on the ASR form, AFATDS will automatically send the request to Mission Processing functions (where duplication and FSCM checks are performed). The mission will appear in the intervention point window to show you the recommendation.

NOTE!

Only “Air” will be considered in attack analysis when you created an immediate air request using this method.

If Air was recommended, and you accept the option, AFATDS will send an ASR to the OPFAC that is specified as the action address in your Immediate CAS/AI mission routing. If an information address was also specified, a copy of the request will also be sent to that address.

- Another way to initiate immediate CAS missions is from the “Initiate Fire Mission” (IFM) option. When you do this, ensure that you have some type of Air Support specified in your Guidance (e.g. a unit ID entry in the FS Attack Parameters Guidance for “Air” FS system). On the IFM form select “Air” for the Fire Support system. If intervention is enabled, the mission will appear in the normal intervention point window to show you the recommendation. If Air was recommended, and you accept the option, AFATDS will send an Immediate CAS ASR to the OPFAC entered in your “Immediate CAS” mission routing that “owns” the Air Support assets. If an information address was also specified, a copy of the request will also be sent to that address. The mission will be automatically added to your “Current ASL”.

- If your OPFAC receives a request (ASR) for an immediate CAS or AI air mission, AFATDS will check the current ASL to see if your OPFAC has a confirmed (approved) preplanned on-call CAS or AI mission with the same ASR # as the immediate mission. If there is a matching mission (and the start/stop time for the preplanned on-call mission includes the start/stop time in the immediate request), AFATDS will change the state of the mission to “execute” and send the ASR to the Action Addressee for immediate CAS/AI. If Air mission intervention is enabled, the mission will appear in the normal intervention point window to show you the recommendation. Once you accept the air mission at the intervention, AFATDS will send the ASR to the Action Addressee for immediate CAS/AI. If you do not approve the mission at the intervention, AFATDS will send a deny message back to the requester.

- If AFATDS could not find a matching ASR to match up with the received immediate CAS/AI ASR, AFATDS will look at confirmed (approved) preplanned on-call & scheduled missions that your OPFAC created. If possible (based on a match of the target type and NET/NLT time windows), AFATDS will divert one of these missions to service the immediate ASR. When this happens, AFATDS will change the mission state of the preplanned mission to “Divert” and associate the new target number & location with the ASR and send the request to the action addressee.

- Missions requesting Air that are received at an FSE as a “Fire Request” (FFE, When Ready) will be looked at to determine if the current ASL has a confirmed (approved) preplanned on-call CAS or AI mission with the same target # as the Fire Request. If there is a matching mission (and the start/stop time for the preplanned on-call mission includes the start/stop for the received FR) AFATDS will change the state of the ASR mission to “execute” and send the ASR to the Action Addressee for immediate CAS/AI. If no match can be found, AFATDS will attempt to find a mission to divert. If no mission can be found, AFATDS will run the fire request through normal mission processing to select an attack option. Note that the “normal” attack analysis could result in a recommendation of “Air” for the target, but this will be handled by adding a new ASR to your OPFAC’s current ASL.

- When your OPFAC receives an Immediate CAS or AI ASR, AFATDS will perform a target duplication check and FSCM/coordination criteria analysis. Other target filter checks (like Target Buildup, TSS etc.) are not done when AFATDS processes an ASR. The Immediate CAS or AI Air Request will be displayed at the Intervention Point window (providing Intervention is on). You can approve the ASR (click "OK") as long as AFATDS generated an option. You may also deny the ASR by clicking the "Deny" button. If the Air Mission was sent to a Higher OPFAC as a Fire Request or Order To Fire, once the Higher OPFAC processes the mission the copy of the ASR information generated will be returned to all intermediate and originating OPFACs. The Air Mission generated from a Intervention Point recommendation will then placed in the Current ASL in a "Requested Status" and the operator will receive a "medium level information alert" indicating that the target has been nominated as an Air Mission.

IMPORTANT!!

When your OPFAC receives an ASR for CAS or AI, only Air support options will be generated. AFATDS will not develop options for other FS systems when the requestor has sent you an Air request. If you choose not to accept the Air option, then Deny the mission.

IMPORTANT!!

When your OPFAC receives a deny message on an immediate CAS or AI mission, AFATDS will change the mission status on the current ASL to "Denied" and alert you in the "Thumbs down" portion of the Mission Toolbar. Your only option when this happens (i.e. your immediate CAS/AI request is denied) is to accept (OK) the Deny message. "Reprocessing" the Deny message will have no effect. If you want to reinitiate a mission on the target, then select it from the ASL and do an "Initiate Fire Mission".

- Actions at the final AFATDS OPFAC.

  a. If your OPFAC is the final AFATDS unit in the mission chain (in other words, there is not a CTAPS or TBMCS device to send the mission to), then you are responsible for approving/disapproving the air request. Use the following procedures to execute this task:

     1). First, ensure that you have created an "Air" unit type in the current situation. This "unit represents the Tactical Fighter wing (TFW) or Marine Air group/wing (MAG or MAW) that will actually fly the mission. Since this "unit" does not have a digital device make sure his "Device type" on the master unit list is "Air".   Make sure the "unit" is entered in your Air Mission Routing window for immediate CAS & AI.

2). When an immediate CAS/AI ASR is processed, AFATDS will place the mission at the intervention point (assuming you have indicated that you wish to see the Air attack options via the intervention point rule set or the "intervene" option on the air mission routing window). If a capable air option is developed, the recommendation will be to send the mission to the air unit.

3). Approving the request. If you wish to approve the air mission select the "Ok" button at the IP. The transmission will fail (since the Air unit does not have a digital device). You may print the ASR from the failed transmission window – but do not delete the failed transmission alert until the mission is completed. At this point, nothing has been sent back down the mission chain telling them you approved the air mission. To send the "approval" message back down the chain, open the current ASL (the air mission you just Ok'd will be listed). Select that air mission and then select the "Approve" option. This will update the mission status to "confirmed" and will automatically send an "approved ASR" message back down the requesting chain to the OPFAC that created the air request.

If you want to enter additional air mission data such as the "aircraft call sign", "ordnance load" etc. then before selecting the "approve" option, edit the ASR to include the additional information and "Ok" the ASR window. Now "approve" the ASR from the "option" menu on the ASL.

4). Denying the request. If the AFATDS recommendation is to deny the Air Request and you agree with that recommendation, you may simply select "Ok" button at the IP (this will deny the mission). You may also select the "deny" button on the IP regardless of what the AFATDS recommendation was. AFATDS will automatically send a "Denied ASR" message back down the air mission chain. If you wish to enter "comments" explaining why you denied the ASR, then (before selecting Deny from the IP) find the air mission on your current ASL open the ASR and edit the comments field – type in the reason you decided to deny the request. Then select "Deny" from the option menu on the ASL. This will send the deny message back down the mission chain. Note that you will still have to action the intervention point (you should deny the air mission from there as well).

> **IMPORTANT!!**
>
> **When your OPFAC receives a deny on an immediate CAS/AI air request you previously submitted, it will show up in your "thumbs down" buffer only if the previous OPFAC denied the mission from the intervention point. <u>AFATDS will not</u> reprocess the denied air mission. You should select "OK" on the deny window.**

b. If your OPFAC is interfacing with a CTAPS then you are responsible for approving/disapproving the air request. This is because the CTAPS device will not respond with an approve/deny message when it receives an immediate Air request. Use the procedures described above to manage your immediate air missions. The only difference is that you should not receive a "failed transmission" alert after "Oking" the intervention point (since the message will be sent to the CTAPS). Also, make sure the CTAPS unit is entered in your air mission routing for CAS & AI missions.

c. If your OPFAC is interfacing with a TBMCS then the TBMCS is responsible for approving/disapproving the air request. The TBMCS uses the "REQSTATASK" message to tell AFATDS whether an immediate ASR is approved or denied. The TBMCS does not tell AFATDS much in the way of air mission data (such as ordnance, call signs, etc.) in this message, so if you want this information to go back down the mission chain, you must enter it your self. To do this, edit the ASR before accepting the mission at the intervention point. The data (for example, the aircraft call sign) you enter in the ASR should be coordinated with the TBMCS operator. Once the TBMCS receives the ASR their operator will then approve – causing the ASR approval message to go back down the mission chain.

d. Completing Air Missions. If your OPFAC is not interfacing with a TBMCS, air missions must be manually updated to "completed" by the AFATDS operator. To do this, select the air mission on the ASL and then select "completed" under the "options" menu item. The updated status will be automatically sent back down the mission chain.

IMPORTANT!!

If a "regular" ("non-air support") fire mission or "unsupportable" target that your OPFAC sent was turned into an air mission at your higher OPFAC, you will receive an MFR when the mission is completed. You will not receive any other updates (such as an MTO – or an approved air mission message).

D. CTAPS Messages.

The AFATDS – CTAPS interface provides for exchange of limited information. The messages exchanged between the two systems are oriented to air requests and airspace geometries. The specific messages that are exchanged are:

1. AIRSUPREQ: This is the message that AFATDS uses to send ASRs to CTAPS. Both immediate & preplanned ASRs may be sent with this message, however, CTAPS will not respond to immediate ASRs. When an ASL is transmitted to CTAPS, this message is used.

2. ATO: This is the message that CTAPS sends to AFATDS to provide a listing of the approved ASRs for a given time period (to – from) that reflects a given air day.

3. ACO: This is the message that CTAPS uses to notify AFATDS about Airspace Control Measures (ACMs). These are geometries that define air corridors and other airspace that concerns the supporting air elements. AFATDS will accept up to 300 geometries in this message as air corridors. Some types of airspace geometries in this message are not recognized by AFATDS and are therefore not processed. The types of ACMs that AFATDS will recognize from CTAPS includes:

   AIR ROUTE CORRIDOR (AR)
   ATLANTIC COORDINATED ROUTE LOW (ACRL)
   ATLANTIC COORDINATED ROUTE HIGH (ACRH)
   LOW LEVEL TRANSIT ROUTE (LLTR)
   SPECIAL CORRIDOR (SC)
   TRANSIT CORRIDORS AND ROUTES (TC)
   TRAVERSE LEVEL (TL)

E. TBMCS Messages.

The AFATDS – TBMCS interface provides for exchange of information for air operations as well as situational awareness data. The specific messages that are exchanged are:

1. Air Support Request (AIRSUPREQ): This is the message that AFATDS uses to send ASRs to TBMCS. Both immediate & preplanned ASRs may be sent with this when an ASL or immediate ASR is transmitted to TBMCS, this message is used.

2. Air Tasking Order (ATO): This is the message that TBMCS sends to AFATDS to provide a listing of the approved ASRs for a given time period (to – from) that reflects a given air day. TBMCS may also send an "ATO Update" with this message. The update can selectively deny an air mission that was previously approved or even approve one previously denied. Updates to mission data may also be transmitted by TBMCS with this message.

3. Airspace Control Order (ACO): This is the message that TBMCS uses to notify AFATDS about Airspace Control Measures (ACMs). These are geometries that define air corridors and other airspace that concerns the supporting air elements. AFATDS will accept up to 300 geometries in this message as air corridors. AFATDS recognizes any geometry that is built as a corridor (APMN/SHAPE: CORRIDOR in the ACO for the TBMCS device and CORRIDOR for the TBMCS00 device. Other shapes will not be created as geometries in AFATDS.

4. Mission Report (MISREP): TBMCS sends this message to update the status of an air mission, normally to indicate when the mission is completed and the damage or results achieved (including Battle Damage Assessment). AFATDS uses this message to update the referenced ASR's status to "completed" when the MISREP message indicates that the mission was flown. The MISREP is TBMCS's equivalent of the MFR.

5. Request Status Tasking (REQSTATASK): This message is used by TBMCS to approve or deny an immediate ASR. AFATDS will update the ASR status to "approved" or "denied" based on the data in this message.

6. Unit Status Data (AFUFUS): AFATDS sends this message to AFATDS to provide friendly unit data (generally on AFATDS fire units) to TBMCS. This message may be sent as a result of automatic data distribution or as a "push" of a selected unit's data by the AFATDS operator.

7. Geometry: This message is sent by AFATDS to TBMCS to pass the following types of geometries:

   Forward Edge of Battle Area (FEBA)
   Forward Line Own Troops (FLOT)
   Fire Support Coordination Line (FSCL)
   No Fire Area (NFA)
   Coordinated Fire Line (CFL)
   Restrictive Fire Area (RFA)
   Landing Zone (LZ)
   Drop Zone (DZ)
   Free Fire Area (FFA)
   Airspace Coordination Area (ACA)
   Boundary Lines

NOTE!

Since the interface to TBMCS does not support the PAH & TAH geometries, AFATDS will send these to TBMCS as "ACAs" (this is so the altitude information associated with the PAH and TAH can be given to TBMCS. The PAH & TAH geometry names will always include the PAH or TAH designation followed by the target number (e.g. "PAHAS1025").

NOTE!

An Shorad Zone sent to TBMCS must be either a rectangular or irregular shaped geometry.

8. Free Text (GENADMIN): This message is sent by AFATDS to TBMCS and by TBMCS to AFATDS.

F. <u>Time Critical Targets</u>.

AFATDS allows the operator to specify an immediate air request as a "Time Critical Target" (TCT). The Air components (e.g. TBMCS equipped USAF element) process this type of immediate air mission differently then a "standard" immediate air request. In general, when a "TCT" request is received the Air components will look at approved – preplanned AI missions that can be diverted to attack the time critical target. When

TBMCS receives the “Time Critical” air mission request, TBMCS will send a free text message to AFATDS stating that they received the request. This will be followed up with another PTM that tells AFATDS whether the mission was approved – and if it was approved, the message will identify the ASR that got diverted to support the TCT. The REQSTATASK message will not be provided for these missions by TBMCS.

The TBMCS device uses the mission type in a received ASR to determine whether a target is “Time Critical”. Specifically, TBMCS will be looking for a mission type of “Attack” (“ATK”) to make this determination. To initiate a TCT request, the AFATDS operator simply creates an “Air Interdiction” mission on his current ASL. The Mission precedence should be set to “Immediate” and the Mission type to “attack” (AFATDS will automatically default the mission type to “attack” for immediate AI missions. Also enter the target data as you would for any other AI mission.

When TBMCS decides to divert an existing air mission to attack the TCT ASR, the PTM received at AFATDS will notify the operator. It is incumbent upon the AFATDS operator to update the mission status on his ASL. For example: The PTM says that ASR AAA3001 was approved for attack and ASR SAA2909 was the mission that was diverted, the AFATDS operator should then update the status of ASR AAA3001 to “Confirmed” and update status of SAA2909 to “Denied”.

Upon completion of the mission, TBMCS will generate and send a Mission Report (C130) to AFATDS which will change the mission state of the TCT ASR to “completed”.

Air Support
Targeting with MIDB Data

A. The Integrated Database Transaction Format (IDBTF). The IDBFT is used to communicate data updates between various software systems. The Modernized Integrated Database (MIDB) serves as the central repository for military intelligence information and will provide updates to all organizations that host the MIDB v2.0 databases utilizing the IDBTF (format). AFATDS will receive and process the MIDB data file via SendMail from TBMCS. For each MIDB facility received, the parsed data elements will be: BE number, Category, Coord (location), FAC Name, Osuffix and Status Indicator (create/update/delete). For each enemy MIDB unit received, the parsed data elements will be: Unit Name, Operational Status, Coord (location), Unit ID, Date/Time of last change, Role, Function, Echelon and Status Indicator (create/update/delete). The initial IDBTF will contain the complete MIDB download for the current theater of operation. Subsequent IDBTF files from TBMCS will be received and processed by AFATDS to indicate changed (update, add, or delete) data.

NOTE!

Operators can take AFATDS received MIDB enemy unit data and transfer the data into an Icon on the AFATDS map. The operator highlights a unit entry and clicks on the create icon (second icon). This function creates the enemy unit in the AFATDS database for that OPFAC which can then be edited for content and a name designation added if known. The new enemy unit information can be printed or transmitted to other AFATDS units via normal communications routes.

B. Fixed Site Targets & BE Numbers. A Basic Encyclopedia (BE) number uniquely identifies a facility or manmade object on the battlefield. This includes targets such as buildings, bridges, storage complexes and other fixed sites. If you know the Basic Encyclopedia (BE) number for a CAS or AI target (especially AI), make sure it is entered in the BE # field of the ASR form. Note that when you initially create a target on a target list you may enter the BE # at that time. This way when you copy that target into the ASL the BE # will automatically be placed in the ASR. CTAPS and TBMCS want the BE # when they process ASRs for fixed targets. They use the BE # to access their Modern Integrated Database (MIDB) to get the latest information on the target you want attacked. For a list of BE #s (including type of target, location) consult your Air Component representative, or view them in the AFATDS Facility MIDB under the target menu option on the current situation menu bar.

NOTE!

Once you establish a BE #for the ASR, that number cannot be edited after you save the ASR - make sure you verify the correct BE # before "OKing" the ASR.

C. MIDB BE Database. AFATDS can receive a BE target database ("Candidate Facility Data") from TBMCS. When AFATDS receives this data, it is placed in a file for operator access (Current Situation menu bar | Targets | MIDB Facilities). The operator can sort and search in the BE list and select BE numbers to make targets. If you want to plan air missions on selected BE targets, select the target(s) from the BE List and pick the "Add to Target List" option. This will open a list of targets lists (including ASLs). Pick the appropriate list. AFATDS will automatically make an AFATDS target (referencing the BE number) and add it to the selected target list or ASL. Remember, if you added the BE number to an ASL, make sure you go to the ASL to edit the mission to specify the mission start time and mission classification (normally "Air Interdiction").

D. Correlation of AI Missions with BE Number Data. AFATDS will perform an automated target correlation for AI Air requests with the candidate facility data. This is required to assign the associated BE/OSuffix numbers to the preplanned AI Air request(s). This process will be automatically initiated for locally created or received AI Air requests that do not have the BE/OSuffix data available. For each AI mission classification target on the ASL, the correlation process searches the candidate facility data and locates all facilities within a 200 meter radius. For each AI target meeting the location criteria, AFATDS will filter MIDB candidate facilities that do not map to the AFATDS target type. When multiple MIDB candidate facilities match the AFATDS target type of interest, AFATDS will correlate to the MIDB candidate facility located closest to the AFATDS target. When the correlation process generates a matching MIDB facility, AFATDS will update the AFATDS target data to include the correlated MIDB facility: BE Number, OSuffix, Category Code, and Facility Name.

E. MIDB Mobile Target Database. TBMCS can also send mobile targets (enemy units) to AFATDS. When AFATDS receives this data, it will be placed in a file for operator access (Current Situation menu bar | Units | MIDB Units). The operator can search and sort this list and select MIDB units to make into AFATDS enemy units. This will add the new enemy units to the AFATDS enemy unit database. Any subsequent updates to the MIDB units will automatically update any AFATDS enemy unit that was created from the MIDB.

F. AFATDS Allows the Operator to Create Targets from Enemy Units. When this is done, AFATDS maintains a link between the enemy unit and the target location. When the enemy unit location changes (like when a MIDB update is received) the corresponding target will also be updated. If the operator, updates the location of a target that is linked to an enemy unit, AFATDS will alert the operator and (if the operator confirms the target update) deletes the link from the unit and target.

Movement Control Overview

Movement Control facilitates control and coordination of unit movement. Unit SOP dictates the necessity for coordination of a unit Move with a designated Approval Authority, recognizing this authority varies and resides at the command level controlling the land and routes used as a part of the movement, e.g., local tactical moves may require no prior coordination while movement along an MSR may require approval at a very high level.

Movement Control is independent of the Planning and Current contexts. Moves may be tagged as related to a Plan/Phase, however, this is provided for reference only, no link or association is established. When a Plan/Phase is implemented, the operator should review moves related to that Plan/phase and update the timing reference. Moves may be developed as On-Call and H-hour related, which implies the absence of timing useful for deconfliction with other moves, or Moves may be assigned an Absolute time, which provides a deconfliction timing reference. Another key ingredient of timing calculations is Critical Time, which is based on the time the unit enters the Start Point or the time the unit exits the Release Point. The Start and Release Point are reference points along the movement route and are independent of the Starting and Ending Location which denotes where the unit is prior to the start of the Move and will be after the Move is finished.

Routes reference a group of Segments. Route Segments are pre-defined physical paths. Route Segments may be created or sent between OPFACs. A Route Segment may be associated with one or many General Routes or Unit Moves. Do not get misrouted, the term “General” simply means generic or general purpose and is not displayed. Once general Routes and Segments are established, they provide a library of templates for developing Unit Moves. The path a Unit will follow during a Move, the Unit Move Route, is defined by assembling one or more Route Segments. Given sufficient planning time the Approval Authority at each level, within the maneuver area which is the basis for his authority, should be able to construct several general Routes/Segments for distribution to subordinate elements. This preparation improves traffic control and eases the task of subordinate OPFACs in developing Unit Moves. Entire sets of general Routes/Segments may be exported to removable media and imported at a later date or at remote OPFACs. This should be a top-down process, with each level adding detail, since this feature replaces the entire set of Route/Segment data. After initial distribution, by import/export, subsequent Route Segments are created and pushed up and down, each expanding the existing data set, this also provides the bottom-up portion of the information loop.

Deconfliction refers to the management of space, time and units - which should not be confused with the management of space, time and firing or Clearance of Fires - regardless of the potential information overlap, they are two separate tasks. Deconfliction is provided so units do not occupy the same space simultaneously, whether that is enroute or at a future Position Area. Several timing adjustments may be made to proposed Moves (e.g., delay at a Control Point, segment speed, etc.) to remove conflicts. Only Moves based on an Absolute time are compared for possible conflicts, an H-Hour based Move is effectively transitioned to absolute time when the DTG of the H-Hour is provided. On-Call and H-hour based Moves are not automatically deconflicted with other known moves when transitioned to absolute times.

A Move Requirement may be used to direct a subordinate unit, it contains the minimal amount of information needed to start planning a Move and is essentially equivalent to a warning order. A Move Request is an expansion of the Move Requirement and contains the additional information required to coordinate a Move, it may be processed through approval channels - with each intermediate level deconflicting the proposed Move with other Moves known to that OPFAC and forwarding the Move (without changing the approval status) toward the Approval Authority. Deconfliction by intermediate units in the approval chain may involve altering routes or timing for one or more conflicting units. It is not advisable to alter information for a Unit Move after it has been forwarded to a higher level and is pending approval.

The OPFAC at the Approval Authority level, having secured the appropriate approval from the maneuver commander’s representative, transitions the Move Request to a Move Order (by approving the Move) and returns it through channels towards the unit requesting movement. Along the way a check is made, by the unit controlling these allocations, to determine if the moving unit is currently assigned responsibility for an FPF or priority targets. These Unit responsibilities should be reassigned prior to the start of the Move. A Move which has been transitioned to the Move Order state cannot be altered by other than the Approval Authority OPFAC. Prior to the start of the Move, the moving unit should initiate any required CONOPS activities. The moving unit must change its status to Moving at the start of the Move and back to Ready at the end of the Move, as appropriate relative to any CONOPS procedures required.

Movement Control Setup

No.	Action
1.	Establish Movement Guidance. Open the Current or Plan Map:
1a.	Select “Guidances | C3 | Movement Guidance” to display the Movement Guidance window.
1b.	Enter a priority (1,2,3, etc.) for one or more of the Unit Roles displayed.
2.	Establish Movement Factors for specific units. Open the Current or Plan Map:
2a.	Select “Units | Edit...”, the Select Unit window appears. Highlight the desired unit. Click OK.
2b.	The Basic Unit Info window will appear. Select “Options | Movement Factors”.
2c.	The Movement Factors window will appear. Enter the appropriate information in each field, none of the fields require an entry. Note: Unit Bridge Classification refers to the bridge classification of the heaviest vehicle in the unit; Unit Daily Hauling Capacity refers only to units with ammo resupply vehicles and is based on one turn of their combined hauling capacity; Maximum Fording Depth refers to the max fording depth for the vehicle with the least fording capability; Maximum Width, Height and Length refer the largest dimensions among any of the vehicle(s) in the unit.

To Develop General Route Segments

No.	Action
1.	Open the Current or Plan Map:
2.	Select “Move | Routes and Route Segments | New Route Segment”, the New Route Segment window appears. Enter a name, e.g. “Hwy1_2B”. Click OK.
3.	The Route Segment Information window appears.
3a.	Enter the nominal Speed the segment will support.
3b.	Select the appropriate Road Type from the pull-down list provided.
3c.	Select Coordinates.

No.	Action
4.	The Edit Route Segment window opens. Two or more (up to 32) coordinates may be entered to depict the segment. Enter the points in order from start to end:
4a.	Manipulate the map to display all or as much as possible of the area the segment will cover. This may require dragging windows or scrolling the map.
4b.	Capture coordinates from the map.
4c.	Returning to the Edit Route Segment window: Click in the empty location block then paste the coordinates.
4d.	Click Apply. A new, blank location block appears. The segment section just entered appears as a symbol on the map. Note: After pasting the first coordinate no symbol will appear and a warning is displayed reminding you two or more coordinates are required. After the second coordinates are pasted the warning disappears and sections are depicted on the map.
4e.	Repeat as necessary. When all coordinates are entered, Click OK. The sections now form a complete Route Segment and the named symbol appears on the map.
5.	The Route Segment Information window appears. If any obstructions exist on the segment, click Obstructions.
5a.	The Obstructions window opens.
5b.	Select New. Obstruction Information window opens.
5c.	Enter obstruction Location coordinates.
5d.	Select Type of obstruction.
5e.	Enter descriptive data for obstruction.
5f.	Click OK.
5g.	Obstructions window is activated. Repeat procedure for each obstruction on segment or click OK to close Obstructions window.
6.	Click OK to close Route Segment Information window and save information to database.

To Develop General Routes

No.	Action
1.	Open the Current or Plan Map:
2.	Select “Move | Routes and Route Segments | New Route”, the New Rte Segment window appears. Enter a name, e.g. “MSR_Vette_3IDFSE”. Click OK. Note: it is useful to include an indicator of the approval authority (OPFAC) for a controlled access Route and Segment.
3.	The Route Identification window appears. Use the map to capture Route Segments to be included in this Route:
3a.	Manipulate the map to display all or as much as possible of the area the Route covers. This may require moving windows or scrolling the map.
3b.	Select each segment <SHIFT>+<ALT>+Left-click, the Segment becomes highlighted and is added to the list of included Segments. The segments must be contiguous (no gaps). Deselecting a previously selected Segment causes it to be removed from the list, along with any segments that followed in the case of an intermediate Segment.
3c.	If a warning appears indicating the selected Segment cannot be added, deselect that Segment before attempting to add a different segment. Note: The offending Segment will not become highlighted even though it has been selected.
3d.	Repeat as necessary. When all desired segments are added, Click OK.

To Edit Route Segments

No.	Action
1.	Expanding the information associated with a Route Segment: Select “Move | Routes and Route Segments | Edit...”, the Select Route/Route Segment window appears.
2.	Toggle the radio button for “Route Segment”, a list of segments appears in the lower box. Highlight the desired segment. Click OK, the Route Segment Information window appears.
3.	Select the appropriate Road Type from the pull-down list provided.
4.	Select Obstructions, the Obstructions window appears.

No.	Action
4a.	Highlight an existing obstruction from the list provided and Select Edit or Select New to create a new obstruction, the Obstruction Information window appears.
4b.	Select the Type from the pull-down list and provide other known descriptive information, then Select OK to return to the Route Segment Information window.
5.	Select Intersections, the Intersections window appears. A list of intersections are automatically generated as potential route conflicts. Listed intersections may be removed or regenerated. When finished, Click OK to return to the Route Segment Information window.
6.	Select Coordinates, the Edit Route Segment window appears.
6a.	If a coordinate is unintentionally entered during the create or edit process it may be removed or replaced:
6a1).	Click on the desired location field then Click Delete. That location is removed.
6a2).	If a location is to be replaced by a new location, capture the coordinates and paste them to the desired location block. The new coordinates will overwrite existing data.
6b.	If the coordinates are unintentionally entered in the opposite order desired, Click Reverse Locations. The first location becomes the last location, etc.
6c.	If it is necessary to place a new coordinate between existing locations:
6c1).	Click the existing location block that should follow the new block.
6c2).	Click Insert Before, a new location block appears.
6c3).	Capture and paste coordinates into the new location block.
6d.	Click OK to save changes and return to the Route Segment Data window.

To Edit Routes

No.	Action
1.	Editing of Routes is limited to adding or removing segments from the Route. Select "Move | Routes and Route Segments | Edit...", the Select Route/Route Segment window appears.
2.	Toggle the radio button for "Route", a list of Routes appears in the lower box. Highlight the desired Route. Click OK, the Route Identification window appears.
3.	Adding a segment:
3a.	Using the map, select the segment to be added. This segment should be added to the last segment (not the starting segment).
3b.	If a segment must be inserted, all segments following the insertion point must be deselected (removed) before adding the new segment.
4.	Removing a segment: Using the map select the last segment added and work backwards until the desired segment is removed. Reconstruct as necessary.
5.	When all changes are complete, Click OK.

To Transmit Route Segments

No.	Action
1.	Note: Only Route segments can be transmitted, Routes cannot be transmitted: Select "Move | Routes and Route Segments | Edit...", the Select Route/Route Segment window appears.
2.	Toggle the radio button for "Route Segment", a list of segments appears in the lower box. Highlight the desired segment. Click OK, the Route Segment Data window appears.
3.	Select Send, the Select Unit window appears. Highlight the Unit(s) desired, Click OK.

To Import and Export Route Segments

No.	Action
1.	Export/Import Route Segments: Note: Importing replaces the entire existing route segment database and should be used carefully. Exporting overwrites any existing segment archive on the removable media. This capability is primarily intended as a means to provide the initial set of preplanned Routes/Segments and secondly to provide a means to synchronize units via a common data set when excessive variations have accumulated or after catastrophic failure.
2.	Export: Insert the removable media into its drive bay.
2a.	Select "Move | Routes and Route Segments | Export Route Segments", the Export Route Segment window appears.
2b.	Highlight the appropriate choices from the lists provided and select the Export button.
3.	Import: Insert the removable media into its drive bay.
3a.	Select "Move | Routes and Route Segments | Import Route Segments", the Import Route Segment window appears.
3b.	Highlight the appropriate choices from the lists provided and select the Import button.
3c.	Close and re-open the Current Situation or Plan window as applicable.

To Develop a Unit Move

No.	Action
1.	Open the Current or Plan Map. Select "Map | Overlays | Routes" to display routes and route segments.
2.	Select "Units | Moves".
3.	The Select Unit window opens to allow selection of the unit to move. Once the unit is selected Click OK.
4.	The Display Moves window opens: This window displays all the Moves for the unit you previously selected and allows you to edit or delete an existing Move or create a new Move. Click New.
5.	The Unit Move window opens:

No.	Action
5a.	Enter the coordinates for the Start Location and End Location. Coordinates may also be copied from the map. The start location is not necessarily the current location of the moving unit and the end location is not necessarily the exact place the unit will establish itself. These locations may coincide with the Start Point and Release Point referenced later. Note: if a Position Area is associated with the Move, the End Location should be with the boundaries of this geometry.
5b.	Select a timing method:
5b1).	Absolute: A hard DTG, the actual time.
5b2).	H-Hour: A soft time, relative to a hard DTG (the actual H-Hour) to be established later. An H-Hour Move should not be deconflicted until the H-Hour DTG has been established.
5b3).	On-Call: Unknown DTG, probably relative to an event which will later determine an absolute time. Since an On-Call move does not have a specific timing reference, it cannot be deconflicted with other Moves.
5c.	Select the critical time reference, based on either the Time out of the Start Point or Time into the Release Point. For example “the unit must be at the release point by 312300ZJun99” or “the unit must cross the start point at H+15”.
5d.	Enter the Critical Time. Critical time is not required for On-Call Moves. The critical time is a time that must be met by the moving unit relative to the critical time reference. Critical time is entered either as a DTG (Absolute) or +/- minutes (H-Hour).
5e.	When the H-Hour DTG becomes known it may be entered to transition the move an absolute timing reference. Otherwise leave this blank.
5f.	Enter the Azimuth of Fire (for a Fire Unit) or Azimuth of Search (for a Sensor) that should be assumed at the new location. Otherwise leave this blank.
5g.	Enter the Position Area the moving unit will occupy at the end of the move, if one has been assigned. This is the Position Area that will be used for deconfliction purposes. If no Position Area has been assigned, leave this blank. Selecting the “Position Area” pull-down menu will bring up a list of the Area Geometries to select from

No.	Action
5h.	When finished with the entries on the Unit Move window the Move is at the Move Requirement state. A Move Requirement may be sent to a unit as a warning to plan for a Move. To keep the Move in the Move Requirement state Click OK. All Move related windows will disappear. See “Transmitting a Unit Move” for information on sending a Move Requirement. To continue developing a Unit Move and transition the Move to the Move Request state, Click Next. The Movement Table Tools window opens.
6.	From the Movement Table Tools window:
6a.	Use the map <SHIFT>+<ALT>+Left-click to add individual route segments to the Move, starting with the one closest to the intended starting location and then in order towards the ending location.
6b.	After selecting the first route segment, the Start-Point (SP) icon will become sensitive. Do not click this icon until all route segments have been selected.
6c.	Click on the SP icon. The Control Point Information window opens.
6d.	Enter the Start Point Location, Delay at Control Point, Report, and Description information. Click OK. Repeat this process to place the Release-Point and any desired control points along the route.
6e.	Next click on the Override Obstructions button to view and override any obstructions as desired. The Override Obstructions window will be displayed: Clicking Override will nullify all listed obstructions, otherwise press Cancel. The Movement Table Tools will appear.
6f.	Returning to the Movement Table Tools window, click the Column Length button. The Unit Column Length window will appear. Enter the desired gap between vehicles. Click OK. The Column Length field will be updated. Click OK. The Movement Table Tools window re-opens.
6g.	Once the Route Segments have been selected, the Move has all the information needed for a Move Request. The Move Request may be deconflicted with all moves known to this OPFAC or forwarded through the approval chain where it will be further deconflicted and eventually approved/denied and returned. Click OK.

To Transmit a Unit Move

No.	Action
1.	Select “Moves | Unit Moves Table”, the Move Request Order Table window appears. Highlight the desired Move, paying particular attention to the State field. The State field is an indicator of the options available and actions required, e.g., “Request not Sent” indicates this Unit Move should be forwarded for approval. Insure the actions required at this OPFAC for this Move have been completed. Click either Send or Request Approval based the desire to inform another OPFAC or request approval (which changes the Move state to “approval requested”). The Send To window appears.
2.	Select the desired recipient. Click OK.

To Deconflict a Unit Move

No.	Action
1.	Select “Moves | Unit Moves Table”, the Move Request Order Table window appears. Highlight the desired Move, paying particular attention to the state field. The state field is an indicator of the options available and actions required, e.g., “Approval Requested” indicates this Unit Move should be deconflicted and either forwarded for approval or approved at this OPFAC, as appropriate. Click Move Table. The Move Table window will appear.
2.	Select “Options | Deconflict Route”, the Deconflict Route window appears. This is a very powerful graphical interface window where changes may be made by clicking and dragging the displayed time bars. The time-line graphs display the subject unit on top with any conflicting Move time-lines displayed below. Only changes to the subject unit time-line are possible, though alternatively that Move can be opened and deconflicted in a similar manner. Also consider the undesirable and unexpected behavior possible when changing the time-line for a conflicting Move which has previously been forwarded but is still pending approval. That OPFAC would not be aware of your subsequent modifications when deconflicting and processing the approval request. Use trial-and-error to determine the best way to resolve conflicts. As each modification is made click Calculate to observe the results:

No.	Action
2a.	Modify the basis of the critical time (Start Point or Release Point). This is usually a last resort option since there is probably good reason this was initially selected.
2b.	Modify the Critical Time. This is also a last resort factor.
2c.	Modify the delay at a Control Point (displayed as CPn with n being the CP Number). Drag the right edge of the time-block (Left-click & drag) right to increase the delay or left to decrease the delay. This is probably the most appropriate factor to alter.
2d.	d. Modify the speed on a segment by dragging the right edge of the time-block. This is slightly less desirable than modification of CP delay times since the unit may have difficulty complying due to equipment capabilities or road conditions.
2e.	Optionally, conflicts may be ignored by selecting Override Conflicts. This is both expedient and desirable if it is likely projected conflicts will not impact the Move based on the road or terrain, etc.
2f.	When all conflicts have been removed and/or overridden, Click OK. The Move Table window appears.
3.	Select "Options | Deconflict Position", the Deconflict Position window appears. AFATDS determines, by examining known Moves, if another unit is designated to occupy the Position Area associated with this Move and if the locations specified by the two units are "close". If so, there is a potential conflict. Conflicts are either resolved by changing the location of a unit or by overriding the conflict. AFATDS displays the location for this Move and information related to conflicting Moves, if any.
3a.	Modify the Location for the Move. If the location is changed AFATDS will verify the new location is within the designated Position Area. Click Deconflict. AFATDS will determine if further conflicts arise. 500M Northing and Easting trial & error changes are recommended. If all conflicts are resolved the Move Table window returns.
3b.	Alternatively, click Override. The Move Table window returns.
3c.	Alternatively, open the Move for a conflicting unit and change its location. Before taking this approach, be sure to consider whether this move has been previously forwarded.

To Process a Move Request

No.	Action
1.	Upon notification that a Move Request has been received: Select “Moves | Unit Moves Table”, the Move Request Order Table window appears. Highlight the desired Move and verify the Move is in the Request state. Display Routes on the map “Map | Overlays | Routes”. Determine the appropriate action based upon the Unit Move information presented and your responsibilities in the approval process:
1a.	If you do not have movement approval authority for any unit movement, click Request Approval to forward the Move Request toward the appropriate approval authority. This will probably be your Higher Headquarters or via that headquarters to the FSE collocated with the maneuver commander controlling the affected area, unless otherwise dictated by SOP.
1b.	If you do have some unit movement approval authority: Click Move Table, the Move Table window appears. Compare the route segments listed with the map to determine if the Move resides entirely within your authority, e.g., the Move does not cross an MSR controlled by a higher authority and you have direct access to the maneuver authority representative controlling the affected area.
1b1).	If the Move is not within your approval authority, click Request Approval to forward the Move Request toward the appropriate approval authority.
1b2).	If the Move is within your approval authority, use the “Options | ” menu to deconflict the route and position areas. Then click Move Table, the Move Table window appears.
1b3).	Select “Options | Deny/Approve”, the Approve Deny Move window appears.
1b4).	Use the pull-down Move Is menu to select a status (Approved or Denied). This window also contains space for descriptive or instructional text. Click OK. The Move transitions to the Move Order state. The Move Table window appears.
1b5).	Select “Options | Send”, a warning appears if the moving unit is assigned an FPF (OK the warning), otherwise, select the moving unit or the appropriate intermediate unit return path. If you are the unit responsible for assignment of FPFs, note when the FPF should be reassigned and override the FPF.

No.	Action
2.	Override conflicts and FPF warning: Route and Position Area conflicts, plus FPF notifications can be overridden if desired:
2a.	Select “Moves | Unit Moves Table”, the Move Request Order Table appears.
2b.	Select “Override | Override (Final Protective Fire or Position not deconflicted or Route not deconflicted)”, the selected option will be overridden.

To Process a Move Order

No.	Action
1.	Upon notification that a Move Order has been received: Select “Moves | Unit Moves Table”, the Move Request Order Table window appears. Highlight the desired Move and verify it is in the Move Order state. If the moving unit is your OPFAC review all move information to discover the modifications on your original request that resulted from conflicts, etc. Click Move Table, the Move table window opens. Observe the route on the map, using the map, open the segments and control points to review their contents (highlight a symbol, Right-click, Select Edit from the pop-up menu to display the data, cancel out when finished).
2.	If the moving unit is not your OPFAC, determine if you have responsibility for assignment of FPFs for the moving unit and if an FPF has been assigned to that unit. If so, note when the FPF should be reassigned, override the FPF and send the Move to the moving unit either directly or through any remaining intermediary units.
3.	If the moving unit is not your OPFAC and you have no FPF assignment responsibilities, send the Move to the moving unit either directly or through any remaining intermediary units.

Movement Control Maintenance

No.	Action
1.	Periodically review the list of Unit Moves (“Moves | Unit Moves Table”, the Move Request Order Table window appears) to determine which Moves have been completed or are otherwise candidates for deletion. Highlight the desired Move and click Delete, the Move will be deleted. Routes and segments used in the deleted Move will be retained.
2.	Periodically review the list of Routes and Route Segments Moves (“Moves | Routes and Route Segments | Edit...”, the Select Rte or Rte Seg window appears) to determine which routes or segments are candidates for deletion. Highlight the desired segment and click Delete. When deleting a Route only the association of segments with that route is removed, the segments remain available. When deleting Route Segments AFATDS will determine if the segment is still in use by any Move or has been associated with a Route, if this is the case the Segment in Plans window will appear. Observe the list to determine if removal of the segment is still desirable. Click Cancel to retain the segment or Delete to remove the segment.

CONOPS

A. General.

The acronym CONOPS stands for Continuity of Operations. It refers specifically to the process whereby one OPFAC assumes the critical fire mission processing functions of another OPFAC. From time to time, OPFACs must shut down temporarily to displace to new locations. OPFACs may also shut down unexpectedly due to equipment failure or enemy action. The CONOPS process is designed to allow a designated “backup” OPFAC to assume the mission processing role of another. AFATDS CONOPS provides the following capabilities.

1. A means to designate a primary and secondary backup unit for all OPFACs.
2. A means to transfer active mission data between OPFACs when passing control to a backup unit.
3. An automated data distribution scheme to keep the databases at backup OPFACs in close conformance with their supported OPFACs’ databases.
4. A procedure which allows backup and supported OPFACs to smoothly transfer control.

B. Definitions.

1. Principal Unit: the unit that is going down and requires a backup.
2. Backup Unit: the unit that will backup the principal unit by assuming its mission processing responsibilities.
3. Satellite Units: the principal's commanding, subordinate, supported, and supporting units.

C. Design Description.

1. Operational Threads. CONOPS consists of four major operational threads:

    a. CONOPS Setup: This thread describes operator actions necessary to enter and maintain the appropriate CONOPS information in the AFATDS database.
    b. Execute planned CONOPS: This thread describes the actions taken when a backup OPFAC assumes control for a principal

OPFAC. In a planned CONOPS transition, the principal executes an orderly transition and shutdown procedure.

c. Execute Unplanned CONOPS: Once again, the backup OPFAC assumes control for the principal, but in this case there is no opportunity for an orderly transfer of control. In an unplanned transition, the principal shuts down suddenly and unexpectedly.
d. Terminate CONOPS: This thread describes actions taken when the principal OPFAC is ready to resume its normal mission. It describes the orderly return of control from the backup to the principal

2. CONOPS Setup.

Preliminary setup for CONOPS support is essential to success. Before an operation starts, knowledgeable personnel must develop a plan for CONOPS support, designate CONOPS assignments, and provide this information to all concerned. All OPFACs must then enter CONOPS information in their respective systems in accordance with this plan. CONOPS assignments are typically made and disseminated to AFATDS OPFACs using the 'CONOPS - Unit Backups' table, found under the Guidances/ Miscellaneous pulldown menu. See Table 21 for an example of this table.

a. CONOPS Capabilities.

1). Stores additional CONOPS data:
 a). CONOPS relationships stored as part of unit data.
 b). Associated communications configuration for CONOPS "scenario".
 c). A CONOPS "Checklist" window.

2). The CONOPS Checklist window provides detailed instructions to guide the operator through the steps in the CONOPS process. The operator can amplify the instructions in the checklist with additional text input. This allows the operator to write "reminders" to himself regarding complex steps in executing CONOPS transitions. This is especially useful in recalling communications setup details.

3). Provides the capability to transmit planned communications configurations between OPFACs. In this way, a single OPFAC can develop comm configurations for several OPFACs, and transmit the results in a form which the receiving OPFAC can readily implement with only minor modification.

4). Provides the capability to automatically archive the AFATDS database at an operator specified time interval. This assists on OPFAC which experiences an unexpected failure in recovering quickly with minimal data loss.

5). Provides the capability for any backup OPFAC, regardless of role, to perform the same level of attack analysis as performed by the principal OPFAC. This is accomplished by modifying the attack analysis logic to eliminate target filter check exclusions that were part of the A96 product. Specifically, the exclusion applied to FA CP and FU type units for IEW Coordination, Tgt Exclusion, and Target Build-Up Area Checks are eliminated. The elimination of these exclusions is not limited to CONOPS situations, but is applied generally to AFATDS mission processing.

b. CONOPS Setup Procedure.

In order for CONOPS to work properly, any unit assuming another unit's mission must duplicate the mission processing functions inherent in the "supported" and "command" relationships. The backup unit must respond to fire requests/orders from the principal's "supported" unit(s) and must exercise control over the "commanded" units.

1). Setup.

AFATDS provides a data entity (a subset of unit data) for storing CONOPS information. It is accessed through the CONOPS information window. (The window is accessed through the Unit Basic Info window.) This window provides operator access to the following critical CONOPS data:

a). "Address Missions To" field. The entry here indicates whether or not a CONOPS transfer of control is in effect for the unit shown in the "Unit ID" field. Possible entries in this field are:

(1). Principal: The standard entry, which indicates normal operations, i.e. no CONOPS is going on for this unit.

(2). Primary: This entry indicates that the unit listed in the "Primary Backup" field has or is assuming control for the principal unit.

(3). Secondary: This entry indicates that the unit listed in the "Secondary Backup" field has or is assuming control for the principal unit.

b). Active Unit Organization checkbox: Entries are “on” or “off”. This field is enabled only if Primary or Secondary are selected in the Address Missions To field. An entry here indicates that the unit indicated by the Address Missions To field has assumed the command and support relationships of the principal OPFAC.

c). Mission Routing: Entries are “on” or “of”. This field is enabled only if Primary or Secondary are selected in the Address Missions To field. An entry here causes the backup OPFAC to assume the principal’s position in the mission processing chain. When the principal OPFAC performs a planned CONOPS transition, the operator makes entries in all three fields at once (Address Missions To, Active Unit Organization, and Mission Routing) to cause AFATDS to transmit the principal’s active mission files to the backup OPFAC. At the backup OPFAC, simultaneous entries in these three fields cause the backup to transmit active target list query messages to the principal’s subordinate, higher headquarters, and supported units.

d). Primary Backup: The unit entered here is the designated primary backup OPFAC for the principal, i.e. the unit listed in the Unit ID field. It is the unit that assumes control when Primary is selected in the Address Missions To field.

e). Secondary Backup: The unit entered here is the designated secondary backup OPFAC for the principal, i.e. the unit listed in the Unit ID field. It is the unit that assumes control when Secondary is selected in the Address Missions To field.

f). Active Command, Active Supported : The entries in these fields are for information only, and have no impact on processing.

g). Unit Backed Up (1, 2, 3): The unit entered here is the unit receiving the backup services of the unit shown in the Unit ID field on the form. AFATDS will not allow the operator to initiate CONOPS unless the entry in this field in the primary (secondary) unit's CONOPS data corresponds to the principal OPFAC initiating the CONOPS scenario. E.g., FSE MAIN (the principal unit) wishes to initiate CONOPS with FSE TAC as the primary backup. The unit data for FSE TAC must show FSE MAIN in one of the Unit Backed Up fields, or the FSE MAIN OPFAC will not allow CONOPS to be initiated.

2). Illustrative Example.

The 52d Mech Division is conducting offensive operations. The 52d DIVARTY is in direct support of the Division. 17th FA Bde is attached to the 52d DIVARTY. 1st Bde is the division’s main effort. 2-3 FA is in direct support of 1st Bde. 2-42 FA is reinforcing 2-3 FA (see figure 45).

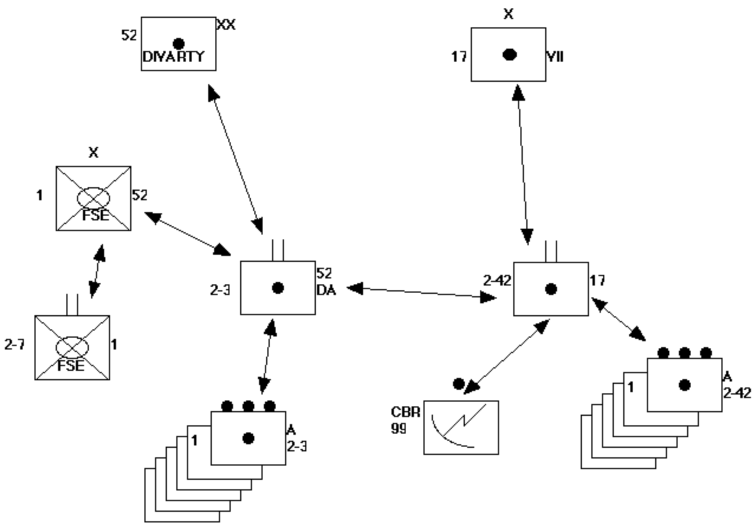


Figure 45. Illustrative Tactical Scenario

Table 21 shows a partially filled out CONOPS-Unit Backups table. This partial table reflects 4 basic principles of backup assignment.

a). Make backup assignments 'reciprocal' when possible, i.e. If A backs up B, then B should also backup A.

b). Backup units should have similar roles and unit echelons.

c). Backups should have the same zone of operations and battlefield tasks as the principal.

d). To the extent possible, MAKE BACKUP ASSIGNMENTS HABITUAL! CONOPS is a complex process. It requires training and rehearsal. Units will be able to execute more effectively if they work with the same unit routinely.

Needless to say, no CONOPS situation will allow all of these principals to be fully adhered to in all cases. Decision makers must choose the best fit available. Also note that this table doesn't attempt to assign secondary backups. Commanders must weigh the relative merits of the additional robustness provided by secondary backup units, vs. the added complexity in setting up databases and training the process. One option might be to assign secondary backups only to selected OPFACs with especially critical functions.

Table 21. CONOPS Backup Assignments

Unit	Primary Backup	Secondary Backup
52nd DIVARTY	17th FA Bde	
17th FA Bde	52nd DIVARTY	
2-3 FA	2-42 FA	
2-42 FA	2-3 FA	

Let us consider the CONOPS data maintained by 2-3 FA. It is the direct support artillery battalion for 1st Brigade, 52d Mech Division (a “supported” relationship, i.e. 1st Brigade is supported by 2-3 FA). It has six subordinate firing platoons (a “command” relationship). It has a reinforcing battalion (2-42 FA, a “supporting” relationship, i.e. 2-42 FA is a “supporting” unit for 2-3 FA). It has a higher headquarters (52d DIVARTY, a “higher Headquarters” relationship).
Table 22 describes CONOPS “scenarios” that will have a direct impact on 2-3 FA, and must therefore be stored by 2-3 FA.

Now, let us examine the CONOPS information that 2-3 FA will need to support this scenario.

Table 22. 2-3 FA CONOPS Scenario Data			
Scenario	Action Required of 2-3 FA	CONOPS Info Entries	2-3 Role in CONOPS Scenario
2-42 backs up 2-3	pass control to 2-42	Unit ID: 2-3 FA Primary Backup: 2-42 FA Active Command Units: 1 A 2-3, 2 A 2-3 1 B 2-3, 2 B 2-3, 1 C 2-3, 2 C 2-3 Active Supported Units: FSE 1 Bde Unit ID: 2-42 FA Unit Backed Up: 2-3 FA	Principal
2-3 backs up 2-42	Establish comm with / assume control of 2-42 subordinates (firing platoons and CBR 99) Establish comm with 1 Bde FSE and 52 DIVARTY	Unit ID: 2-42 FA Primary Backup: 2-3 Active Command Units: 1 A 2-42, 2 A 2-42, 1 B 2-42, 2 B 2-42, 1 C 2-42, 2 C 2-42	Backup

Table 22. 2-3 FA CONOPS Scenario Data			
Scenario	Action Required of 2-3 FA	CONOPS Info Entries	2-3 Role in CONOPS Scenario
		Active Supported Units: 2-3 FA	
17 Bde backs up 52 DIVARTY	Establish comm with 17 Bde. Update CONOPS Info for 52 DIVARTY.	Unit ID: 52 DIVARTY Primary Backup: 17 Bde Active Command Units: 2-42 FA, 2-3 FA Active Supported Units: FSE TAC 52MD	Satellite
FSE 2-7 backs up FSE 1 Bde	Establish comm with FSE 2-7. Treat as supported unit.	Update CONOPS Info for FSE 1 Bde. Unit ID: FSE 1 Bde Primary Backup: FSE 2-7 Active Command Units: FSE 1-7, FSE 2-7 Active Supported Units: FSE TAC 52MD	Satellite

Note that in order for CONOPS processing to work properly, there must be perfect agreement in the principal and backup OPFAC databases with regard to CONOPS Info entries. If 2-3 FA's CONOPS Information for 2-3 lists 2-42 FA as the primary backup unit, then 2-42 FA's CONOPS Information for 2-3 must also list 2-42 FA as the primary backup unit.

Table 23. CONOPS Scenario Information, 2-42 FA			
Scenario	Action Required of 2-42 FA	CONOPS Info Entries	2-42 Role in CONOPS Scenario
2-42 backs up 2-3	Establish comm with 2-3 Satellite units (52 DIVARTY, FSE 1st Bde, 2-3 firing platoons).	Unit ID: 2-3 FA Primary Backup: 2-42 Active Command Units: 1 A 2-3, 2 A 2-3 1 B 2-3, 2 B 2-3, 1 C 2-3, 2 C 2-3 Active Supported Units: FSE 1 Bde	Backup
2-3 backs up 2-42	Establish comm with/ assume control of 2-42 subordinates (firing platoons and CBR 99)	Unit ID: 2-42 FA; Primary Backup: 2-3 Active Command Units: 1 A 2-42, 2 A 2-42, 1 B 2-42, 2 B 2-42, 1 C 2-42, 2 C 2-42 Active Supported Units: 2-3 FA	principal

This synchronization in OPFAC database entries extends to satellite units as well. FSE 1 Bde must also have the same entries in its CONOPS Information for units 2-3 and 2-42. If 2-3 or 2-42 fire units are AFATDS equipped, they must also store the same CONOPS information.

3). CONOPS Checklist. The following additions to the CONOPS Information are made for A98:

a.). An associated communications configuration. If the CONOPS scenario in question requires extensive changes to communications, a planned communications configuration can be built and stored beforehand, and it's name stored with the CONOPS information. The operator will be prompted to implement this planned comm configuration as part of the CONOPS procedure.

b). A "CONOPS Checklist." Window. This will be displayed to the operator as a new window. AFATDS stores and displays five versions of this window, reflecting the five unique CONOPS situations:

Initiate Planned CONOPS -- Principal
Initiate Planned CONOPS -- Backup
Initiate Unplanned CONOPS -- Backup
Terminate CONOPS -- Principal
Terminate CONOPS -- Backup

It contains the following:

(1). A list of all steps to be executed by the local OPFAC for the CONOPS scenario

(2). Each of the steps has an associated free text field within which the operator can enter additional text.

(3). The checklist window has a status indicator for each step in the checklist. As the operator completes the associated action, he enters a character in the checklist column to show completion.

3. Planned CONOPS. A description of the Planned CONOPS procedure is found in table 24.

Table 24. CONOPS Operator Procedures -- Planned Assumption of Control by Backup OPFAC		
Principal OPFAC	Backup OPFAC	Satellites
Step 1: Before initiating formal CONOPS procedure, Notify satellite units that CONOPS transition with (backup) is imminent. Clear as many missions from the active target list as possible before initiating CONOPS.	Step 1: Review PTM from principal unit. Review CONOPS procedures. Review CONOPS comm config and physical changes to comm setup.	Step 1: Review PTM from principal unit. Review CONOPS procedures. Keep transmissions to principal to a minimum.
Step 2: Open CONOPS Checklist window. Print checklist. Close window.	Step 2: Review message from principal OPFAC requesting CONOPS support. If you are ready to provide support, proceed with step 2. If not, inform the principal that you are not ready.	
Step 3: -- Send FREE TEXT to backup requesting CONOPS support.	Step 3: Open CONOPS Checklist window. Print checklist. Close window.	
Step 4: Modify mission processing parameters: -- Set intervention points to "all" so that all missions stop for operator review before processing.	Step 4: Edit CONOPS Information for the principal OPFAC: --"Address Missions To" Primary (or Secondary, depending on the ID of the backup unit).	

Table 24. CONOPS Operator Procedures -- Planned Assumption of Control by Backup OPFAC		
Principal OPFAC	Backup OPFAC	Satellites
-- Only high priority missions should be accepted at this point. The operator should direct other requestors to resubmit missions to the backup OPFAC once the backup assumes control.	Click "Active Unit Org" box. This causes the backup unit to assume the principal unit's command and support relationships with satellite OPFACs. OK the window. This applies the changes. Review and delete the "CONOPS Transition Successful" warning message. You are now prepared to receive the principal's active target list (ATL).	
Step 5: Process all missions in the IP, Coordination, and More Info windows.	Step 5: Send a message to the principal OPFAC stating 'Unit Org Updated.' This lets him know that you are ready to receive the ATL.	
Step 6: When IP, Coordination, and More Info windows are clear, review FREE TEXT message from backup OPFAC, stating 'Unit Org. Updated'.	Step 6: Deactivate the automatic purging of inactive targets and MFRs. You will need to keep this information on file so that you can update the principal OPFAC's mission files when he resumes normal operations.	
Step 7: Transmit the active target list to the	Step 7: Wait for receipt of active target	Step 2: Respond to voice (PTM) directive

Table 24. CONOPS Operator Procedures -- Planned Assumption of Control by Backup OPFAC		
Principal OPFAC	Backup OPFAC	Satellites
backup OPFAC in the following manner: -- Insure that Step 5 above is complete, I. e. no missions are awaiting action at the IP, Coordination, or More Info windows. -- INSURE THAT THE BACKUP IS READY TO RECEIVE THE ATL. The backup indicates his readiness to receive the ATL with a FREE TEXT stating 'Unit Org Updated.' -- Edit CONOPS Information for this unit. "Address Missions To" Primary (or Secondary, depending on the ID of the backup unit). Click "Active Unit Org" box. This causes the backup unit to assume this unit's command and support relationships with satellite OPFACs Click "Mission Routing." This causes the backup OPFAC to assume this OPFAC's	list (ATL) from principal OPFAC. A warning message indicating receipt of the active target list should appear shortly after sending the 'Unit Org Updated' message to the principal If it is not received within 3 minutes, contact the principal and request retransmission. *(NOTE If retransmission is unsuccessful, transition to the 'unplanned CONOPS' procedure by doing the following:* *- Edit CONOPS Info for the principal unit. Set "Address Missions To" back to primary. "OK" out of the window. Review and delete the "CONOPS Transition Successful" warning message.* *- Go to step ___ on the Unplanned CONOPS Transition checklist.)* When ATL received, review and delete warning message. Edit CONOPS info for the principle. Click the	from backup unit. Change comm configuration and physical settings as necessary.

Table 24. CONOPS Operator Procedures -- Planned Assumption of Control by Backup OPFAC		
Principal OPFAC	Backup OPFAC	Satellites
position in the mission routing chain. OK window. This causes the system to implement the changes described above, and triggers the transmission of the ATL to the backup OPFAC.	"Mission Routing" box. "OK" the window. This causes AFATDS to 'merge' the received ATL with the existing ATL. The Backup OPFAC is now fully prepared to assume all mission processing duties for the principal.	
Step 8: The backup OPFAC may request a retransmission of the active target list. If so, there should be a failed transmission alert for the active target list in the comm alert queue. Review this alert and select the "retry" option. If there is no failed transmission alert, resend the active target list by doing the following. -- Edit CONOPS info (this unit). "Address Missions To" Principal. OK the window. Delete "CONOPS transition successful" Message. -- Edit CONOPS info (this unit).	Step 8: Establish communications with the principal's satellite units. If a planned comm configuration has been designated for this situation, implement it now: -- Open "Current Networks" Window -- Switch off networks (Control/All Off) -- Options/Select New Current. This opens the "Select Comm Configuration" window. Highlight the appropriate planned comm config and click "OK". -- Networks/Assign Channels. Assign	Step 3: Establish digital comms with backup. Alter comms setup as necessary to establish communications with the backup OPFAC.

Table 24. CONOPS Operator Procedures -- Planned Assumption of Control by Backup OPFAC		
Principal OPFAC	Backup OPFAC	Satellites
"Address Missions To" Primary (or secondary, as appropriate); click "Active Unit Org" and "Mission Routing." OK the window. This causes the ATL to be transmitted again.	hardware to comm channels as appropriate. Select appropriate network characteristics. -- Enable channels by highlighting them and selecting "Control/On." If no planned comm configuration has been identified for the CONOPS situation, edit the existing comm configuration as required to talk to the principal's subordinate units. Make whatever physical changes are required (e.g. switching radio frequencies) to comm devices. Once AFATDS and the comm hardware are properly configured, establish voice communications with the satellite units. If necessary, direct them to make changes to their comm setup. Establish digital communications with satellites.	
Step 9: Add Edit Mission Data. Add the	Step 9: Send a FREE TEXT Message to the	Step 4: Review FREE TEXT from Backup

Table 24. CONOPS Operator Procedures -- Planned Assumption of Control by Backup OPFAC		
Principal OPFAC	Backup OPFAC	Satellites
backup OPFAC to the MFR routing table.	Satellite OPFACs '(backup) is assuming control for (principal)'. This message prompts the operators at the satellite OPFACs to edit CONOPS info for the principal (address missions to: primary/ secondary (as appropriate), check the 'active unit org' box).	OPFAC, stating that the Backup is assuming control.
Step 10: Archive the database to optical disk.	Step 10: Edit Msn Info/MFR Routing. Add the principal unit as a destination unit.	Step 5: Edit CONOPS Info for the principal unit. Change "Address Missions To" to read Primary (or Secondary, as appropriate). Click the "Active Unit Org" box. OK the window.
Step 11: When archive is complete, send a FREE TEXT Message to the backup, stating "(Principal) is signing off."	Step 11: Review 'Signing Off' message from principal. Note the time of receipt. Enter in the CONOPS checklist. (NOTE: If no 'Signing Off' message is received, note the approximate time that the CONOPS transition was completed, and enter this time in the CONOPS Checklist window.	

Table 24. CONOPS Operator Procedures -- Planned Assumption of Control by Backup OPFAC		
Principal OPFAC	Backup OPFAC	Satellites
	AFATDS will copy the time of receipt to the “Terminate CONOPS” checklist for the principal. This time will be used as the “from DTG” entry to send MFR data to the principal.	
Step 12: Disable communications. Shut down the OPFAC.	Step 12: Edit Msn Info/MFR Routing. Delete the principal unit from MFR Routing.	
	Step 13: Send FREE TEXT to satellites: “(Backup) has assumed control for (principal). Edit Principal CONOPS Info, click ‘Mission Routing’ box.” Transition is now complete. Close CONOPS Checklist window and continue operations.	Step 6: Edit CONOPS Info for the principal unit. Click the “Mission Routing” box. OK the window. Review and delete “Mission Routing Update Successful” warning message. CONOPS transition is complete. Continue operations.

4. Terminate CONOPS. A description of the Terminate CONOPS procedure is found in table 25.

Table 25. Terminate CONOPS -- Return Control to Principal

Principal OPFAC	Backup OPFAC	Satellites
Step 1: Prior to sending request to terminate CONOPS, do the following: Initialize OPFAC. Restore database. Reconfigure communications. Establish communications with backup OPFAC. Contact Backup OPFAC. Tell them you are back on the air and ready to resume control.	Step 1: Prior to transition, contact satellite units, let them know that CONOPS transition is imminent.	Step 1: Minimize message traffic to backup. Defer all but the most critical missions.
Step 2: Open CONOPS Checklist (Edit/This Unit/CONOPS/Terminate). Print checklist. Close window.		
Step 3: Update Msn Info routing. Delete backup unit from MFR routing.		
Step 4: Send FREE TEXT to backup, "Ready to resume control. Terminate CONOPS."	Step 2: Review FREE TEXT from principal requesting termination of CONOPS.	

Table 25. Terminate CONOPS -- Return Control to Principal		
Principal OPFAC	Backup OPFAC	Satellites
	Step 3: Open CONOPS Checklist (Edit/(Principal) Unit/CONOPS/Terminate). Print checklist. Close window.	
	Step 4: Send MFRs to principal. Use the Principal Sign Off time from checklist as the “From DTG” to enter in the “MFR Routing” window.	
Step 5: Clear Active Target List. MFRs received from backup should eliminate most active missions. Remainder must be processed by the operator.		
Step 6: Edit CONOPS Info for this unit. “Address Msns To:” Principal. OK the window. Review and delete “CONOPS Reorg. Successful” and “CONOPS Msn Routing Successful” warning messages.	Step 5: Edit CONOPS Info for principal unit. “Address Msns To” Principal. OK the window. Review and delete “CONOPS Reorg. Successful” and “CONOPS Msn Routing Successful” warning messages.	
Step 7: Send FREE TEXT to backup: “Ready to resume control.” Establish communications with satellite units.	Step 6: Restore standard communications configuration. Disable direct communications with principal’s	Step 2: Establish communications with principal. Return to normal comm setup. (Maintain indirect comm channel with backup.

Table 25. Terminate CONOPS -- Return Control to Principal		
Principal OPFAC	Backup OPFAC	Satellites
	satellites. Maintain indirect comm channel with satellites through principal OPFAC. (See Step 9)	See Step 4).
		Step 3: Edit CONOPS Info for principal. "Address Msns To" Principal. OK the window. Review and delete "CONOPS Reorg. Successful" and "CONOPS Msn Routing Successful" warning messages.
Step 8: Send FREE TEXT "(Principal) has resumed control from (backup). Send current unit data."	Step 7: Send current unit data to principal for this unit and other selected units as appropriate.	Step 4: Send current unit data for this unit to principal.
	Step 8: Send current geometry data to principal. "Transfer Current" window. Select all geometry.	
Step 9: Update intervention points. Return to standard entries.	Step 9: Remove principal from MFR routing. Reactivate automatic purge of MFRs, inactive missions, if desired.	

Table 25. Terminate CONOPS -- Return Control to Principal

Principal OPFAC	Backup OPFAC	Satellites
Step 10: CONOPS transition is complete.	Step 10: CONOPS transition is complete. Close checklist window. Active missions initiated with principal's satellites should be completed through backup using an indirect comm channel through the principal.	Step 5: CONOPS transition is complete. Active missions processed through the backup should be completed through the backup.

5. Unplanned CONOPS. A description of the unplanned CONOPS procedure is found in table 26.

Table 26. Unplanned CONOPS		
Principal OPFAC	Backup OPFAC	Satellites
Step 1: Principal OPFAC suffers catastrophic failure.	Step 1: Backup OPFAC determines that Principal OPFAC has failed.	
	Step 2: Open CONOPS Checklist window (Unplanned). Print checklist. Close window.	
	Step 3: Deactivate Autopurge of MFRs, Inactive Tgts.	
	Step 4: Establish communications with the principal's satellite units. If a planned comm configuration has been designated for this situation, implement it now: -- Open "Current Networks" Window -- Switch off networks. (Control/All Off) -- Options/Select New Current. This opens the "Select Comm Configuration" window. Highlight the appropriate planned comm config	Step 1: Alter comms setup as directed by backup OPFAC. Establish communications with backup.

Table 26. Unplanned CONOPS		
Principal OPFAC	Backup OPFAC	Satellites
	and click “OK.” -- Networks/Assign Channels. Assign hardware to comm channels as appropriate. Insure network characteristics are set correctly. -- Enable channels by highlighting them and selecting “Control/On.” If no planned comm configuration has been identified for the CONOPS situation, edit the existing comm configuration as required to talk to the principal’s subordinate units. Make whatever physical changes are required (e.g. switching radio frequencies) to comm devices. Once AFATDS and the comm hardware are properly configured, establish voice communications with the satellite units. If necessary, direct them to make changes to their comm setup.	

Table 26. Unplanned CONOPS		
Principal OPFAC	Backup OPFAC	Satellites
	Establish digital communications with satellites.	
	Step 5: Once communications are established, edit CONOPS Info for the principal. “Address Msns To” Primary (or Secondary, as appropriate); Click the “Active Unit Org” and “Mission Routing” boxes. OK the window. This causes an active target list query to be automatically transmitted to the principal’s subordinate, supporting, and command units. Review and delete “CONOPS Reorg. Successful” and “CONOPS Msn Routing Successful” warning messages. (NOTE: Processing of the ATL Query is fully automatic and invisible to the operators at the satellite OPFACs)	
	Step 6: Transmit FREE TEXT	Step 2: Edit CONOPS Info for the principal unit.

Table 26. Unplanned CONOPS		
Principal OPFAC	Backup OPFAC	Satellites
	"(Backup) is assuming control for (Principal)." to principal's satellite units. Direct them to update CONOPS Info for the principal.	"Address Msns To" Primary (or Secondary, as appropriate); Click the "Active Unit Org" and "Mission Routing" boxes. OK the window.
	Step 7: Review "CONOPS Status" window. When a sufficient number of satellite units have responded to the ATL query, press "Continue" button. This will cause AFATDS to merge the received ATL data with the local ATL. If "Failed Transmission" alerts for ATL query message appear, resend these as necessary. (NOTE: The operator must exercise judgement in determining what constitutes a sufficiency of ATL information from the satellite OPFACs. In most cases, the best course of action will be to proceed with whatever mission information is received on the first query attempt.	

Table 26. Unplanned CONOPS		
Principal OPFAC	Backup OPFAC	Satellites
	Missions that are not received by the backup can be reinitiated if necessary.)	
	Step 8: Send FREE TEXT “(Backup) has assumed control for (Principal)” to all satellite units.	
	Step 9: Transition complete. Note the time control was assumed and enter on checklist.	Step 3: Transition complete. Continue operations.

6. CONOPS and Air Operations

a. Immediate Air Mission Processing: So long as the principal and backup OPFACs have the same air mission routing chain, the backup can process new air missions for the principal’s satellite units when he assumes control for the principal. If the principal signs off with immediate ASRs ‘in progress’, he should transmit the ‘current’ ASL to the backup before signing off. ‘In progress’ immediate ASRs will require manual updating from the next OPFAC in the air mission chain, i.e. changes in mission status for missions initiated by the principal will not be automatically sent to the backup. When the principal resumes his duties, he can automatically update ASR status by having his ‘higher’ send the ‘current’ ASL to him. Air missions initiated through the backup and still active when the principal resumes his duties should be completed through the backup (just like with other active missions)

b. Preplanned Air Mission Processing: If the principal will be down for only a few hours, the simplest solution is to defer forwarding of preplanned ASRs until the principal is back on line. If the backup must forward preplanned ASLs, then the two OPFACs must be prepared to manually exchange mission information when the ATO is disseminated. Missions on the ATO will automatically be parsed down to their originating OPFAC. If this happens to be the backup unit, the backup must update the principal sending updated mission information.

c. Air Mission routing. The air mission routing information is not sent between AFATDS OPFACs. This is because each OPFAC will have a unique routing requirement for their preplanned and immediate ASRs. For example, a Division FSE's and a Brigade FSE's air mission routing would normally be different (Division routes to "Corps" while Brigade routes to "Division FSE"). In a CONOPS situation, the backup OPFAC's "normal" air mission routing should be used. This will prevent undesirable routing of air missions just because you are in CONOPS. Reconstituting air missions after CONOPS will require close management by the AFATDS operator.

AFATDS Functions

The AFATDS Functions applies to all platforms: UCU and CCU-2; unless indicated otherwise. The AFATDS Functions items are listed in sequence they appear on the UCU/CCU-2.

1. Netscape Browser. Opens Netscape Navigator to allow the operator access to E-mail.

2. AFATDS Operators Notebook. Selection opens an electronic file of the AFATDS Operator's Notebook for that version of AFATDS. The Operator's Notebook has a table of contents that is linked to the appropriate section of the Operator's Notebook.

3. AFATDS Operators Manual. Selection opens an electronic file of the AFATDS Operator's Manual for that version of AFATDS. The Operator's Manual has a table of contents that is linked to the appropriate section of the Operator's Manual.

4. View End of System Log. Allows the user to view messages as they are added to the system log. This function may only be terminated by closing the viewing window (via double-click on dash in upper left corner of window frame).

5. View End of AAS Log. Allows the user to view messages as they are added to the AFATDS Application Server (AAS) log.

6. Re-initialize Log Db. Initializes the Log Databases that are used for record and playback. The operator will need to re-initialize the Log Databases the very first time AFATDS is loaded on a workstation and every time the AFATDS database is restored.

7. Enable/Disable External Message Log. Each of the tactical communications gateways (TACFIRE, MTS and NATO) are capable of logging sent and received messages to a text file. Each entry in the file contains the message text itself as well as any pertinent data extracted from it. These log files may be viewed via View Event Log Files or saved to a floppy via Save Logs.

   By default, logging of messages is disabled. Logging can be enabled by running the "External Message Logger" tool. A command line prompt appears where you can type 'q' to quit, '?' to get a list of commands, or any of the following commands:

0. Display messages enabled - Shows the current logging status for each protocol for sending and for receiving.
1. Enable all messages - Enable all message logging for all protocols.
2. Disable all messages - Disable all logging for all protocols.
3. Enable/disable all TACFIRE messages - Toggle the message logging status for the TACFIRE protocol. If it was ON, it will now be OFF.
4. Enable/disable all MTS messages - Toggles the message logging status for the MTS protocol. If it was ON, it will now be OFF.
5. Enable/disable all NATO messages - Toggle the message logging status for the NATO protocol. If it was ON, it will now be OFF.
6. Enable/disable ACCS messages - Toggles the message logging status for the ACCS protocol. If it was ON, it will not be OFF.
7. Enable/disable EPLRS messages - Toggles the message logging status for the EPLRS protocol. If it was ON, it will not be OFF.
8. Enable/disable 47001 messages - Toggles the message logging status for the 47001 protocol. If it was ON, it will not be OFF.

Note that message directions are either DATA_REQUEST (outgoing) or DATA_INDICATION (incoming). When prompted by these latter options, enter TRUE to enable a particular direction or FALSE to disable it.

8. Save Logs. This selection is used during a problem to save the current AFATDS logs and status to a floppy disk for later analysis. When selected, a window is opened which will prompt the operator for information regarding the problem. Follow the following instructions to use the save logs facility.

   a. Select I for an ITO problem or F for a Field problem; press RETURN.
   b. Enter information for each question or prompt.
   c. When complete, the window will disappear. Eject the disk.

9. Save Backup Logs. This selection is used following a problem in which the machine was restarted. It is used to save the backup AFATDS logs and status to a floppy disk for later analysis. When selected, a window is opened which will prompt the operator for information regarding the problem. Follow the following instructions to use the save backup logs facility.

a. Select I for an ITO problem or F for a Field problem; press RETURN.
b. Insert the floppy to save the logs on, wait for the prompt, then press RETURN.
c. Enter information for each question or prompt.
d. The logs will be saved to the floppy. If you chose to save the databases, this operation may take some time.
e. When complete, the window will disappear. Eject the disk.

10. Execute Dump Utilities. This function allows AFATDS software engineers to tune and debug AFATDS System Support software parameters. Note that misuse of these tools can cause failure of AFATDS software, so casual users should avoid their use. The available dump utilities are:

a. ecd - Lists information about the configuration of External Communication Devices (either LAN or TCIM). Current information on buffering and flow control is also available.

b. heartbeats - Lists the processes being tracked by the heartbeat mechanism and the current perceived health of AFATDS processes.

c. ipc - Lists resource utilization by processes communicating via AFATDS Inter-Process Communication.

d. isc - Lists resource utilization by processes communicating via AFATDS Inter-Software Communication.

e. routes - Lists information held by the communication system pertaining to how to route ISC messages within and between OPFACs.

f. sm - Lists statistics indicating current shared memory utilization on a workstation.

To access any of the dump tools, enter the name of the data (or at least the unique first part, e.g., 'e' -> ecd or 'ip' -> ipc). All the dump utilities except dump_routes provide help if you enter '?' and quit if you enter 'q'. dump_routes displays the options prior to each prompt and quits when you enter '8', but will not fully terminate until the window is closed (via double-click on dash in upper left corner of window frame).

11. Set System Log Filters. This tool provides a means of affecting what log messages go into the System_Log file and what messages go into the Event Log Database when Ss_Log_Services.Insert_Entry is invoked. By default, the System_Log file receives everything and the Event Log receives all except Debug and Information log messages. The tool allows the creation of filters to affect one or both logging areas. The filters for the System_Log are independent from the ones that affect the Event Log.

    Initially, Set System Log Filters will be working with the log level of Osr_Logger (i.e., ready to display or allow updating of items associated with the System_Log file). The current log level is always displayed to indicate which log one is working on. Options are:

    0. Update Log Level - Permits changing the log level of interest between the System_Log and the Event Log. When selected, the pertinent enumeration values are displayed. One of them must be correctly typed in (case insensitive) to complete the update.

    1. Display ENVIRONMENT - Indicates whether the system is running as Developmental or Fielded.

    2. Update ENVIRONMENT - Permits changing between Developmental and Fielded. Note that changing a fielded system to Developmental may cause system failure.

    3. Display PERSPECTIVE - Indicates the perspective of the filters for the current Log Level. The valid values are:
        a. NO_FILTERS - No filtering of any kind is done - every entry is taken. This is the default value for the System_Log.
        b. FILTERS_ARE_BLOCKERS - All filters defined for the associated log level will be used to indicate what entries to exclude.
        c. FILTERS_ARE_ENABLERS - All filters for the log level indicate what to include. This is the default for the Event Log.

    4. Update PRESPECTIVE -- Permits changing the perspective for the filters of a particular log level. When this option is selected perspective enumeration values are displayed, and one of them must be correctly entered to complete the update.

    5. Display CATEGORIES -- Displays the list of categories and a Boolean value with each to indicate which of them are pertinent to the defined filters of the current log level. By default the System_Log has all set to False and the Event Log has Debug and Information set to False and others to True.

6. Update CATEGORIES -- Permits changing the pertinent categories. When this option is selected, the categories are displayed one by one - each requiring the entry of the desired Boolean value for it.

7. Display DEBUG filter -- For as many filters as are indicated by a configuration file, the filter entry is displayed. Each entry consists of four items - each containing two fields. The four items are KEY, CSCI, CSC, and CSU. The two fields associated with each are a Boolean flag and an item value. For CSCI the Boolean is set to True to indicate that all CSCI's entries are to be filtered; if the Boolean is false, then the item value should be set to a particular CSCI whose entries are being filtered. The same is true for the CSC and CSU items. (As of this writing the Key item is not used - just set it's Boolean to True.)

8. Update DEBUG filter -- Permits changing one or more filters. When selected, it prompts for an index value - index 99 will exit this option. Other indices must be in the range that are displayed by option 7. When changing the default filters, its a good idea to overwrite the values at index 0 since it would have no effect to indicate in index 1 to filter only SS, when the default filter values in index 0 say to filter all CSCI's. With that in mind and having selected your index, when asked to filter all keys, say true; when asked to filter all CSCI's, if you say False, you will be prompted for a CSCI value to filter, enter it. Then when asked to filter all CSC's, say True if you want all within the CSCI to be filtered, or enter False and the value of the CSC to filter; similarly the CSU level. From the CSCI level down, once you enter a True value, you need not enter any more data for that filter.

9. Filter Test -- Permits running a sample of items and a category through the filtering mechanism to check whether you've achieved the desired filtering. Prompts for each item come up (including Key - which should be entered as 0 unless it comes to have meaning), after the prompt, enter the desired value to check on (or nothing if a True value is in affect at the item's level or a higher one). Then put in the category. The items and category are run through the filter and a message indicates whether an entry matching them would have gone into the log at the current log level.

12. Remove Backup Logs. The backup logs take up some space on the internal hard drive, sometimes quite a bit of space. Selecting this menu item deletes the backup logs from the internal hard disk. This

only needs to be used if an alert is generated which indicates the internal hard disk is almost full.

13. Set Operational Indicators. Selection allows operators to set Operational Indicator codes for Package 11 submessages. There are three Operational Indicator codes: Operational, Exercise, and Simulation. Operators can select one of the three Operational Indicator codes for messages that are to be sent. The default setting for the send submessage Operational Indicator code is Operational. Operators can select one, two, or all three Operational Indicator codes (Operational, Exercise, or/and Simulation) for messages that are received. The default setting for the receive Operational Indicator code is Operational.

    Changes to the script for Set Operational Indicators are made by selecting the number of the item you want, entering it after "Selection?", and pressing Enter to execute your selection. You can select Display Current Values to see the current values at any time. When viewing Current Values, True means that the item is selected and False means that the item is not selected. Return to Main Menu takes you back to the main menu for Set Operational Indicators.

    When the Operational Indicator values are changed, AFATDS must be exited and restarted before the changes to the Operational Indicator take effect.

14. Set Router Address. Selection allows the operator to define the IP address for the Default Route if the workstation is going to be on a Wide Area Network.

15. Select DB Suite for Restore Databases. Allows the operator to select the database to restore from the OD Magazine.

16. Database Utilities. This utility supports the Backup or Restore of databases from / to a floppy disk. This utility can be used to copy databases between the different AFATDS platforms.

17. Access LAN Printer. Selection allows the operator to define the IP address and name for a network laser printer.

18. Mount OD. This selection mounts the optical disk to the drive.

19. Unmount OD. This selection unmounts and ejects the optical drive from the drive.

20. Eject Floppy. This selection ejects floppy disks for the disk drive.

21. Eject CDROM. This selection ejects the CDROM disk from the disk drive.

22. TDS Setup. This selection only applies to the institutional Training Device System (TDS) using the SUN systems. When the TDS hardware is connected to the SUN systems, this selection disables the keyboard break and prevents the system from locking up when the AFATDS software is loaded.

23. Enable Audio Alerts. Selection turns on the function that gives the operator an audible alert when a fire mission is received. There is no indication given to the operator as to the state (on/off) of the function at the time of selection.

24. Disable Audio Alerts. Selection turns off the function that gives the operator an audible alert when a fire mission is received. There is no indication given to the operator as to the state (on/off) of the function at the time of selection.

25. Audio Alerts Volume Control. Selection opens the Volume Control window that is used to set the audio level for audio alerts. The window opens with this selection only if audio alerts are enabled.

26. Xterm MCS. Selections starts the MCS Xterm capability.

27. AFATDS Ping. This function allows the user to check the connectivity of remote hosts. The AFATDS Ping function uses an AFATDS test message to determine if communications are possible between AFATDS systems.

28. USMTF Exercise Name. Selection opens the USMTF Exercise Name window. This window is used to input names associated with an operation or exercise. The operator is prompted to enter the number for the desired input and select <return>. The prompts that follow instruct the operator to enter the names within the listed parameters.

29. Screen Saver ON. Selection turns the Screen Saver on.

30. Screen Saver OFF. Selection turns the Screen Saver off.

31. UNIX Ping. This function allows the user to check the connectivity of remote hosts. The UNIX Ping function uses the UNIX 'ping' command to check at a fairly low level

32. Host Name Query. Selection opens the Host Name Query window. This window displays a list of IP addresses and associated hostnames within a specified domain and name server. The operator is prompted to enter a domain or use the default.

33. Log Filer. This utility is used to allow AFATDS development personnel to collect, consolidate, and review logs generated elsewhere. Logs are generally generated in the field on many disks and must be consolidated to one disk for delivery to AFATDS development personnel or the maintenance facility.

34. View Event Log Files. Various event log files may be viewed to assess the status of AFATDS software and messaging. All files may be viewed in the following order:
a. all files in /afatds/event_log whose names end in "_Log"
b. any other files in /afatds/event_log

35. View LAN Status. LAN status may be assessed via two sets of information available via this function. The *arp* information indicates the Internet-to-Ethernet translations in use. The *lanscan* information indicates the configuration and status for each LAN device.

36. View Scratch Files. Various scratch files may be viewed to assess the status of AFATDS software. All files may be viewed in the following order:
a. /afatds/scratch/system_log
b. /afatds/executables/afatds.log
c. other files in /afatds/scratch whose names end in "_Log"
d. any other files in /afatds/scratch

Appendix A: Definitions and Acronyms

The following definitions are for important words and acronyms used in this manual.

ABCA. American, British, Canadian, Australian.

ABCS. Army Battlefield Command System

Acknowledgment. A positive confirmation of receipt transmitted to the originator of a message. This indicates that the message was received successfully. It does not indicate that the message was understood or was able to be processed.

ADA. Air Defense Artillery.

ADLER. Artillery Data, Structural and Deployment Computer Network. The German automated fire support system.

AFATDS. Advanced Field Artillery Tactical Data System.

AFCS. Automated Fire Control System. A communications protocol that is a variant of the TACFIRE protocol used to communicate with Paladin howitzers.

AMDPCS. Air and Missile Defense Planning and Control System

ASAS. All Source Analysis System.

ASCA. Artillery Systems Cooperation Activities. The standard for interfacing fire support missions and data among the fire support systems of the United States (AFATDS), the United Kingdom (BATES), Germany (ADLER), and France (ATLAS).

ATACMS. Army Tactical Missile System.

ATLAS. Automtisation des Tirs et de Liaisons De l'Artillerie Sol-Sol. The French automated fire support system.

Backup. Similar to exporting (see below) but instead copies the entire database onto an optical disk. Backup of databases may be used to save work in case of workstation or database failures or may be used before preparing to install new software. A Restore (see below) copies the database back into the machine.

Balanced Network. In VMF, a balanced network is one which uses multiple channels or hop sets instead of just one. This allows other channels to be used for the network in case one is busy or allows a message on the net to be split into pieces for transmission so that a large message can be sent in less time.

Bandwidth. The amount of data which can be passed over a network in a given period of time. A net which can pass 4800 bits in one second has four (4) times the bandwidth as a net which can pass 1200 bits in one second. A VMF, 2-channel balanced net has twice the bandwidth as a single channel VMF net running at the same speed.

BATES. Battlefield Artillery Target Engagement System. The United Kingdom automated fire support system.

BER. Bit Error Rate. This is the ratio of the number of bits in error to the total number of bits sent. It is used to measure the quality of a network. Jamming and interference cause the BER to increase which lowers the probability of successfully receiving a message.

BFA. Battlefield Functional Area.

Bits per Second (bps). The number of bits transmitted in one second over a network. Eight (8) bits is generally equivalent to one character. Some protocols use data compression which can cause more than one character per byte to be transmitted allowing faster message transmission. The "K" is used to designate 1,000 -- for example, 16K bps is 16,000 bps.

Boot. When a computer starts up initially, it must test its hardware and then load certain operating system software in order to run properly. This is not AFATDS software but is software which allows the monitor to work or the keyboard and trackball or the printer. This sequence of activities is called “booting”. A disk which can be booted from is called a “bootable disk”. The internal hard drive in the UCU/CCU is the default drive for the computer to boot to. By holding down the space bar on startup, you can force the computer to look for other bootable disks such as an AFATDS installation disk. The computer will give you choices of which disk to boot from.

CDP. Conditioned Di-Phase. This is one of several types of data encoding. In CDP, the electrical signal changes phase, or direction, to indicate a transition between different data bits.

COMSEC. COMmunications SECurity.

Configuration. In AFATDS, indicates the setup of the OPFAC or the Communications. In the case of Communications, one Current Configuration which is in use and many Planned configurations for contingency purposes may exist. The Unit Configuration is a hardware setup and only one ever exists -- the Current one.

CSSCS. Combat Service Support Computer System.

CTAPS. Contingency Theater Automated Planning System.

CTP. Common Tactical Picture. An ABCS combined map for situational awareness.

Data Encoding. For transmission, data must be encoded to be sent over a communications media. Data encoding is the process by which data is turned into an electrical signal to be sent over a media (e.g., wireline, CNR, etc.)

Destination Unit. Generally designates a subscriber on a network but can also be used to indicate the destination of a message.

DNS. Domain Name Server.

EPLRS. Enhanced Position Location Reporting System. A position location, navigation, identification, and communications system which AFATDS uses to get current position location and to communicate with other AFATDS OPFACs.

EPUU. Enhanced PLRS User Unit. This is the actual device which AFATDS uses to communicate over EPLRS nets and which the operator uses to get position location information.

Export. To copy information onto an optical disk so that it may be imported later. This generally refers to plans, comm configurations, route segments, etc. rather than whole, entire databases. This method allows information to be transferred between OPFACs with optical disks rather than using radio communications.

FASCAM. Family of Artillery Scatterable Mines.

FBCB2. Future XXI Battle Command Brigade and Below.

FDD First Digitized Division.

FEC. Forward Error Correction. The use of procedures to correct all or some of the errors in a transmission.

FSCT. Fire Support Control Terminal. This is a hardware arrangement of a UCU, standard high resolution monitor, TCIMs and UPS. The other standard configurations are (1) IUC and (2) MSD.

FSK. Frequency Shift Keying. One of several types of data encoding. With FSK, the electrical signal varies between two frequencies to send the data.

GDU. Gun Display Unit.

GOLAY. A type of forward error correction (FEC) code used in current tactical systems.

HD. Hard Drive. Also known as HDU, hard drive unit. This device stores software, database and operating system information and retains memory even after it has been powered down.

Hold Time. The amount of time, in seconds, a unit waits after receiving a message before an ACK or NAK is sent. This allows higher priority messages like fire missions to be sent before low priority ACK's or NAK's are sent.

IEW. Intelligence and Electronic Warfare.

Import. To copy information back into the computer from an optical disk. This is done following an Export (see above).

IUC. Independent User Center. The commander will be able to run AFATDS on this from remote sites.

Key Time. The amount of time, in seconds, from when the net is keyed until when the message is actually transmitted. This allows the radio to "warm up" before transmission.

LAN. Local Area Network. This is a high speed connection using a coaxial type cable which connects directly to the UCU/CCU. The LAN can be used to tie workstations together within an OPFAC or to tie together two or more OPFACs.

LCN. Logical Channel Number. A number from 4 to 255 which uniquely identifies an EPLRS needline.

MB. MegaByte. A byte is equivalent a character, and a megabyte is equal to over a million bytes (1,048,576 to be exact). This unit of measure is often used to designate the capacity of a disk drive or of RAM.

MCS. Maneuver Control System.

Media. This indicates the actual, physical equipment which is used to construct a network. This may be SINCGARS radios, 2-wire cable, a LAN cable, etc.

MLRS. Multiple Launch Rocket System.

Modulation. The actual technique in which encoded data is transmitted over the net. This entails combining the encoded data with a audio carrier signal which can be transmitted over radio or wire.

MPN. MSE Packet Network.

MSE. Mobile Subscriber Equipment.

MVV. Muzzle Velocity Variation.

NCS. Net Control Station. The NCS is the central EPLRS computer which initializes and manages EPLRS communications nets and provides position reporting services.

Negative Acknowledgment (NAK). Indicates that the message was received but was not able to be processed due to some communication's security feature such as wrong serialization, etc.

Net Access Delay (NAD). The amount of time, in seconds, a unit waits after another transmission is on-going before transmitting. Higher priority units should receive lower NAD's. VMF allows prioritization of subscribers on a net to automatically determine NAD as well as allowing the use of a random NAD.

Network. A given set of units, or subscribers, as well as the media link they communicate through. This link may be wireline or radio and may use one channel or hop set -- or multiple channels or hop sets if it is a VMF balanced network.

NRZ. Nonreturn to Zero. This is one of several types of data encoding. With NRZ, the electrical signal varies between two voltage levels to send the data.

OPFAC. OPerational FACility. This term refers to a set of AFATDS workstations which are tied together on a LAN to perform the functions of a Unit. An OPFAC is given a unique Unit ID (e.g. 1 Bde) and role (e.g. FSE).

PAH. Platoon Air Hazard.

Protocol. A protocol is a rule set which determines how messages are exchanged between two subscribers. TACFIRE, VMF, NATO, EPLRS and LAN protocols are supported by AFATDS.

RAM. Random Access Memory. This is memory that the computer has available to use for processing. Generally, the larger the amount of RAM, the larger the program you can run and the faster the program will run.

Restore. To copy a database previously saved to a disk into the computer for use. This is done following a Backup (see above) of the database.

RGB. Red-Green-Blue. This is the video standard used by the UCU and monitor. The video cable has one connection for red, one for green and a third for blue.

Route. The routing is the path to a subscriber, or unit. Routing may be DIRECT over a given network or may be INDIRECT through one or more units over several different networks.

RS. Radio Set. This identifies an EPLRS EPUU.

Saturation. Indicates that the net is so busy that messages must wait until other messages are finished before transmission.

SCSI. Small Computer Systems Interface.

IMPORTANT!!

Under no circumstances should a SCSI cable be removed when power is applied to the equipment; damage may occur to internal electronics.

Subscriber. A unit with an address which can talk or listen on a network.

TAH. Target Air Hazard.

TBMCS. Theater Battle Management Core System.

TCIM. Tactical Communications Interface Module. This device connects to the UCU via a SCSI cable. This tactical modem allows connection to a wire line adapter for two-wire or four-wire communication and also to various radios. Up to two TCIMs may be installed on one UCU arrangement.

TCP/IP. Transmission Control Protocol / Internet Protocol.

TFD. Technical Fire Direction.

TI. Tactical Internet.

TNS. Tactical Name Server.

TOC. Tactical Operations Center.

UIC. Unit Identification Code.

ULP. Upper Layer Protocol.

UPS. Uninterruptable Power Supply. This device provides filtered power to the UCU, MSEU and monitor. It also provides up to 30 minutes battery backup power in the case of external power loss. An optional audible alarm, turned on/off with a switch on the back-side of the unit, will sound when power loss occurs.

URN. Universal Reference Number.

URO. User Read-Out. This handheld device connects to an EPLRS EPUU and allows an operator to send and receive messages and location requests over EPLRS. It also allows the AFATDS operator to initialize the EPUU for communication with AFATDS.

WAN. Wide Area Network.

Appendix B: Supporting Arms Coordination Center Overview

> **NOTE!**
>
> **The configuration described in this section is based on the AFATDS installation on board USS Bonnehomme Richard, LHD-6, and USS Iwo Jima, LHD-7. Other ship configurations may vary.**

A. Overview

AFATDS will replace manual fire support coordination procedures in the Supporting Arms Coordination Center (SACC) in designated amphibious support ships. AFATDS will not significantly alter the nature of SACC coordination activities – the planning, coordination, and execution of supporting arms in support of a landing force – but it will alter internal operating procedures for fulfilling the SACC mission.

- AFATDS will automatically create and update display information in lieu of the manual creation and maintenance of status boards and situation maps.
- AFATDS will facilitate analog and digital communications in addition to traditional voice communications, to include the automatic dissemination of fire plans and target information.
- AFATDS will facilitate fire support execution by automatic deconfliction of fire support control measures, available fire support assets, and available ordnance.
- AFATDS will receive analog and digital fire requests from ground maneuver units, which may impact the Amphibious Task Force's procedures for Naval Surface Fire Support (NSFS) communications procedures. Naval Gunfire Spotters traditionally talk directly to firing ships. AFATDS offers the capability for Spotters to communicate through the system, allowing for SACC coordination and deconfliction. Local standing operating procedures will need to be developed to address Call for Fire communications until the fielding of a universal Naval Fires Command and Control System, whether it be AFATDS or a future system, and the approval of associated doctrine.

B. SACC Configuration

AFATDS will not require increased personnel in the SACC. SACC radio net operators should attend AFATDS training, and will be AFATDS operators in lieu of manning a voice radio net. Primary SACC officers should attend AFATDS supervisor's training, and will supervise AFATDS operators in the SACC. AFATDS may allow for future reductions in SACC personnel. A single AFATDS can monitor four channels, or communications nets; thus a single operator can monitor all nets routed through that AFATDS.

AFATDS will not require a reconfiguration of the SACC's physical layout. The potential for elimination of status boards and master situation maps may allow for future flexibility with regard to physical layout.

The Naval Surface Warfare Center, Dahlgren Division (NSWCDD), has identified a need to analyze the impact of automation on SACC manpower and layout. The results of any such analysis will be reflected in updated versions of this addendum.

The SACC will be [is] equipped with two AFATDS-loaded computers. These computers are UCU workstations on LHD-6 and CCU-2 workstations on LHD-7. Until the promulgation of related doctrine, utilization of the two systems will be in accordance with the preferences of the Supporting Arms Coordinator. The two systems can be used as a multi-station OPFAC. One possible technique is to utilize one system for execution of fire plans, and one for communication management. Either can transition roles, depending on the situation and needs of the SACC. The two computers comprise a SACC LAN (local area network), which has an interface with the shipboard LAN.

Operational and planning information will be visible on the SHRDs, as well as on the large screen 23TV remote display system. The large screen, as well as two smaller mounted monitors, is part of the existing SACC configuration.

C. Communications Nets

While doctrine exists for voice communications in the SACC, to include which communications nets must be monitored for which specific functions, SACC automation is likely to demand a review of this communications doctrine. To date, issues associated with communications and SACC doctrine have not been fully explored.

The following table lists the minimum communication nets that the SACC monitors, and which nets can be monitored by AFATDS:

Net	AFATDS	Remarks
LF FSC	yes	AFATDS to AFATDS; digital and analog
LF Arty Cmd/FD	yes	AFATDS and BCS to AFATDS; digital and analog
NGF Control	yes***	JVMF digital or analogue
NGF Support	yes***	JVMF digital or analogue
TAR	yes *	DMS/DACT to AFATDS; digital and analog
LAAD Wpn Ctrl	no	lack interface at present
Ship Air Spot	no	lack interface at present
NGF Ground Spot **	yes	DMS/DACT to AFATDS; digital and analog

* If the Forward Air Controller (FAC) uses a DACT to contact the TACC or DASC, AFATDS can monitor that communication. If the mission is handed off to an aircraft, communications between the FAC and aircraft at present would be by voice.
** Not formerly a required net in SACC
***The NGF Control and NGF Spot nets can be operated as digital networks if the spotter is equipped with the DACT and the fire support ship operates Naval Fire Control System. The ship and spotter are entered in the AFATDS master unit list as JVMF devices.

AFATDS will facilitate improved communications capabilities between the SACC and the landing force Fire Support Coordination Center(s) and Fire Direction Center(s) via the Landing Force Fire Support Coordination Net and Landing Force Artillery Command and Fire Direction Net(s).

Naval Gunfire Spotters will communicate with AFATDS in the near term by means of the Digital Message System, AN PSC2A (DMS), until the fielding of the Data Automated Communications Terminal (DACT) in the 2001 timeframe. Spotters have traditionally requested fire over the Naval Gunfire Ground Spot Net. The SACC monitors fire requests and only responds when intending to override the spotter's request; a concept known as "silence is consent." The Spotter will not be able to communicate digitally with supporting NSFS ship, which presently has no interface with AFATDS or DMS/DACT. The Spotter will have to utilize a voice radio to communicate with the firing ship, or use a DMS/DACT to communicate with the SACC, which would then communicate the fire request to a supporting ship. As depicted in the Operators Notebook, AFATDS is configured for a coordination system that involves sensors (i.e., spotters) communicating with the coordinating agency, and then that coordinating agency (i.e., SACC) sending a "fire order" to the firing agency. The speed of digital and analog bursts require this communications routing to allow the coordinating agency time to approve/disapprove/alter fire missions.

For operations supported by non-digitized ships, the Naval Gunfire Control and Naval Gunfire Support Nets will be conducted over voice radios.

The Tactical Air Request Net can be monitored by AFATDS when the Forward Air Controller (FAC) utilizes a DMS/DACT. While AFATDS cannot at present monitor communications with the aircraft, DMS/DACT communication between the FAC and Tactical Air Control Center or Direct Air Support Center will enable the SACC to maintain awareness of air requests. Air missions can be transmitted to the TACC TBMCS via AFATDS.

D. Interface With Ship Communications Architecture

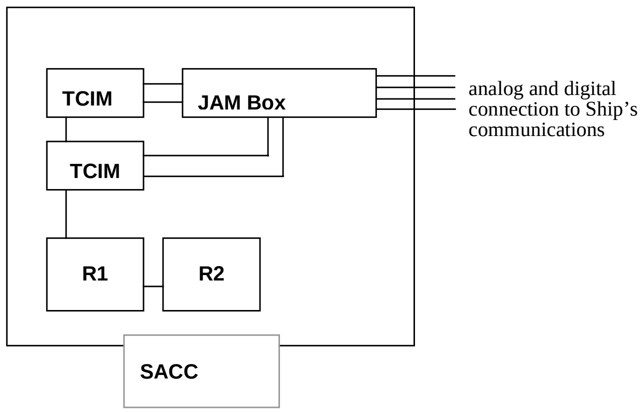


Figure B-1 Digital and Analog Communications via Ship's Communication Architecture

As depicted in Figure B-1, digital and analog communications are transmitted from AFATDS (located in either Rack 1 or Rack 2, and shown in the figure as R1 and R2) through the shipboard communications architecture via the TCIMs (on HHD-6) or SP-TCIMS (on LHD-7), and then through a Junction Box, commonly called a JAM Box. The JAM Box currently installed on LHD-6 includes an RF circuit card that facilitates analog communications by boosting signal strength. Two JAM Boxes will be installed in the SACC. Each will have a four channel capability, with four manual switches. Each manual switch with a digital, analog and off setting is provided for on each channel. The JAM Box will replace the DCT Jack Box (6048A/PSC-2), which currently exists in the SACC.

Note that the CCU-2 hardware suite installed on LHD-7 includes two SP-TCIMs, which perform the same functions as the TCIM. The SP-TCIMs, however, are much smaller and are designed as an internal component to the computer box, as both SP-TCIMs can be inserted into a single port on the CCU-2.

Figure B-1 depicts a four-channel configuration (one JAM Box fed by two TCIMs/SP-TCIMS). This corresponds to the four communications nets that can be monitored by AFATDS at this time. Each AFATDS includes two TCIMs/SP-TCIMs, which under this configuration would provide the SACC with two spares. Figure B-1 also depicts this connection with the system in Rack 1, but either system can be utilized.

With increased interoperability, the SACC may have the option to conduct AFATDS communications on more than four nets, and potentially up to eight nets. To facilitate this expansion, the second JAM Box and the simultaneous use of all four TCIMs/SP-TCIMs will be utilized (see Figure B-2).

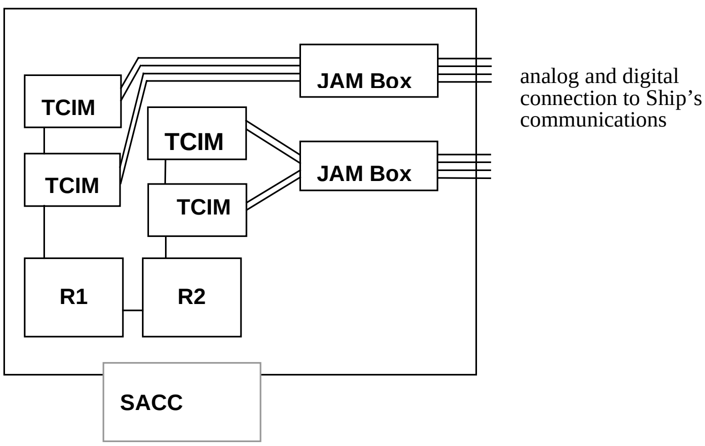


Figure B-2 Digital and Analog Communications over 8 Channels via Ship's Communication Architecture

LHD-6 JAM Box. From the JAM Box(es), analog communications will be transmitted and received through the Secure Voice Switch SA-2112(V)8/STQ, cryptological devices, the Black analog Switch SA-2112A(V)6/STQ, and then to the appropriate radio.

From the JAM Box(es), digital communications will be transmitted through the SB-4124, cryptological, the Black Analog Switch SA-2112A(V)6/STQ, and then to the appropriate radio.

SACC personnel should be familiar with the cabling instructions in the System Initialization chapter of the AFATDS Operator's Notebook. Connection procedures between the TCIMs/SP-TCIMs and Junction Box are not discussed, but include the simple connecting of six-pin radio cables into radio connectors, labeled Channels 1-4. All TCIM-JAM Box connections will be completed by NSWCDD, the installing agent.

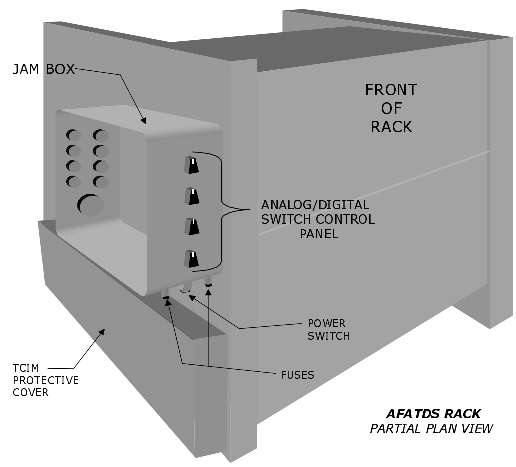


Figure B-3 NSWCDD Jam Box

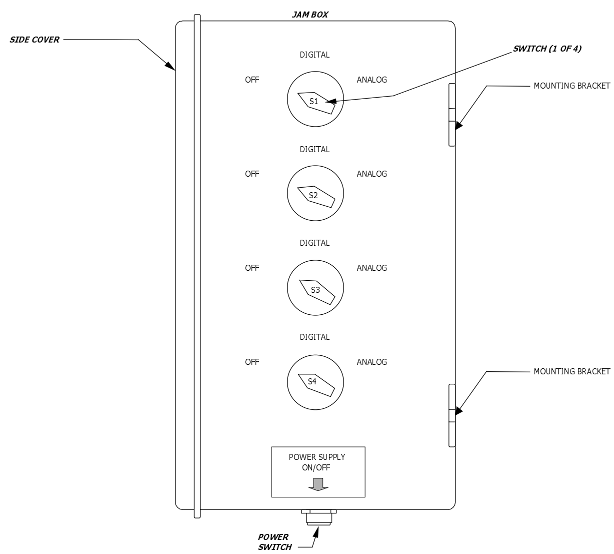


Figure B-4 JAM Box Switches

Voice communications can be executed by using the TA-970 associated with the JAM Box channel. The JAM Box will have the TCIM channel to the TA-970s associations marked.

Depending upon operational situation and effective standing operating procedures, AFATDS VHF communications can bypass the ship's external communications structure, as shown in Figure B-5. Either TCIM can be cabled to a AN/SRC-54 Single Channel Ground-Air Radio System (SINCGARS) in the ship's Radio Transceiver Room via a Remote Control Unit (RCU). The RCU, actually a radio itself but with remote capability, is located on top of Rack 2.

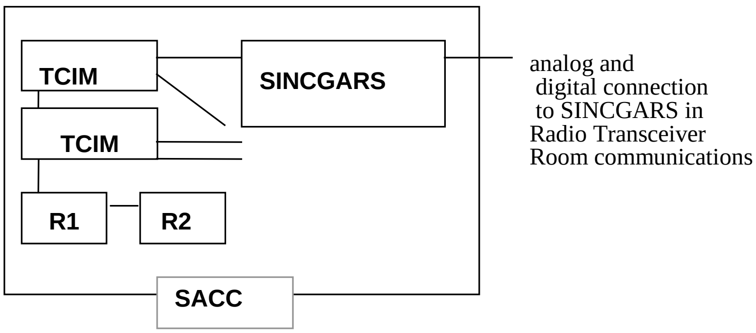


Figure B-5 Bypassing Ship's Internal Switching

The cable connection between the SACC and the Radio Transceiver Room is already established.

Figure B-5 depicts one channel bypassing the ship's external communications, and three routing messages through the JAM Box (not shown). Note that each communications net that bypasses the ship's internal communications will require an RCU. One RCU offers remote connection to one single-channel radio.

Note that communications problems will occur if the SINCGARS and RCU (SINCGARS on Rack 2) are of different developmental generations, designated by a letter nomenclature. For instance, if a C model SINCGARS is employed in the Radio Transceiver room, a C model RCU must be utilized in the SACC.

LHD-7 JAM Box. The JAM boxes installed on board LHD-7 differ from those installed on LHD-6. The LHD-7 JAM box does not boost the analogue data signal. In addition, direct cable connections run from the

JAM box to the appropriate radios. A manual switch on the JAM box provides switching from to access HF radios.

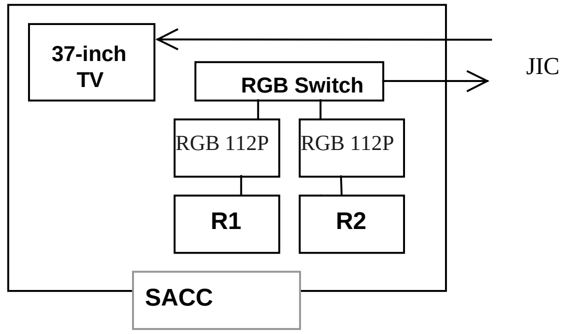


Figure B-6 Large Screen Television Display

As shown in Figure B-6, AFATDS can interface with the shipboard 23 TV Integrated Video System (IVS). This interface allows for the display of AFATDS information from either station over a large-screen 37-inch television screen in the SACC, as well as anywhere on the ship with a 23 TV monitor. The television will display the same image as the AFATDS SHRD (Super High Resolution Display, or monitor). An RGB switch on Rack 2 allows for control over which AFATDS monitor is projected on the large-screen television.

Both AFATDS systems in the SACC include a Commercial Off the Shelf video interface, RGB 112Plus. This interface should be fully connected and operational for SACC personnel upon deploying. However, as this configuration is unique to the SACC and not discussed in the AFATDS Operator's Notebook, connection instructions are provided. To configure AFATDS for television projection:

1. Disconnect the cable between the UCU (or alternate hardware) on Rack 1 and the SHRD from the UCU's 13W3 connector (monitor port).
2. Connect the cable (still attached to the SHRD) to the monitor output port on the RGB 112Plus. This port is labeled Buffered Local Monitor Output.
3. Connect the RGB 112Plus cable, labeled Video Input, to the UCU monitor port.
4. Repeat steps 1-3 with the UCU on Rack 2 so that each is connected to its RGB 112Plus.
5. Connect an RGB cable to the RGB 112Plus. The cable contains three color-coded wires; connect the red wire to the R terminal, green to G, and blue to B.

6. Connect the RGB cable to the RGB Switch on Rack 2. Connect each wire to the proper terminal (again marked R, G, or B) on either of the two sets of input terminals.
7. Using a second RGB cable and the other input terminals on the RGB Switch, repeat steps 5-6 with the RGB 112 Plus from the second AFATDS.
8. Connect a third RGB cable (which should already be cabled between the SACC and the JIC) to the output terminal on the RGB Switch. Connect each wire to the proper terminal (again marked R, G, or B).
9. With the assistance of ship's personnel, ensure that the RGB cable is connected to the proper High Resolution Switch in the JIC.

To operate the large-screen television, power on the television and input the proper code in the key pad located below the screen. This code is provided by JIC personnel. The monitor image from one of the two AFATDS should appear on the screen. To switch to the monitor image from the other AFATDS, simply toggle the two-way switch between Channel 1 and Channel 2 on the RGB Switch. Note that the television itself must be set on the proper channel. Television channels can be set on the key pad below the screen.

E. Interface With Other Shipboard Systems

AFATDS will interface with the Global Command and Control System - Maritime (GCCS-M).

GCCS-M is the Navy's primary afloat Command, Control and Intelligence tactical information management system. GCCS-M workstations are in the SACC, Landing Force Operations Center (LFOC), Joint Intelligence Center (JIC), and Combat Information Center.

Interoperability between AFATDS and GCCS-M is through the track database manager, which allows passage of situational awareness tracks between the systems. This passage of tracks will generate expanded situational awareness and improved coordination between the SACC and other Amphibious Task Force Agencies.

The GCCS-M interface also allows AFATDS geometry and GCCS_M overlays exchanged. Because GCCS-M overlays are linear and area drawings with no associated rule set (such as the coordination invoking properties of an FSCM in AFATDS), these drawings become general lines, points and areas. It is up to the AFATDS operator to duplicate these as the appropriate FSCM if these measures are intended as FSCMs. Appropriate TTPs should be developed by the SACC to address this issue.

AFATDS interfaces with Theater Battle Management Core System (TBMCS) through the shipboard LAN or support net.

TBMCS provides real-time planning and execution capability in support of the tasking and control of theater air assets. A TBMCS workstation is maintained in the Tactical Air Control Center (TACC).

Interoperability, as well as establishing AFATDS-CTAPS communications, are discussed in the Air Support Chapter of the Operator's Notebook.

Appendix B: Supporting Arms Coordination Center Naval Ship

A. The Naval Ship Unit.

Naval Ship unit type is multi-platform capable. Unlike other units in AFATDS, the Naval Ship unit may have more than one weapon type, i.e. Naval Gun, Naval Land Attack Missile, and Naval Cruise Missile (NCM). The unit data stored for the naval ship unit is the same as for any unit but with the following exceptions.

1. Selection of role and function (sea-surface/sub-surface) and function (SSN21, SSN719 or SSN774 for sub surface; DDG51, DDG51 MOD, DD963 and CG47 for sea surface) "templates" the weapons on the detailed info form.

2. Ship templates are provide the following:

   a. SUB-SURFACE role:

      1). SSN21: 12 VERTICAL LAUNCH MISSILE cells (VLS). This is the SEA WOLF CLASS ATTACK SUB.

      2) SSN719: 12 VLS cells. These are the VLS capable LOS ANGELES CLASS ATTACK subs.

      3). SSN774: 12 VLS cells. These are the VIRGINA CLASS ATACK subs.

   b. SEA_SURFACE role:

      1). DDG51: 90 VLS AND 1 5 INCH 54 CALIBER GUN destroyers of the ARLEIGH BURKE CLASS.

      2). DDG51 MOD: 90 VLS AND 1 5 INCH 62 CALIBER GUN. These are ARLEIGH BURKE destroyers beginning with DDG 81.

      3). DD963: 61 VLS AND 1 5 INCH 54 CALIBER GUN. These are destroyers of the SPRUANCE CLASS.

4). GC47: 127 VLS AND 1 5 INCH 54 CALIBER GUN. These are cruisers of the TICONDEROGA CLASS.

B. Naval Ammunition.

Ammunition management is accomplished by managing ammunition assemblies (full-up round) vice separate fuzes. This is done to avoid the following type situation: possibility of 10 WP/TI and 10 HE/PD assemblies being available and AFATDS tasking HE/TI because the fuzes were stored separately. Naval Fire Control System (NFCS) on the surface combatant will report by assembly. New naval ammunition is available to the Naval Ship unit.

1. The 5'62 caliber Extended Range Guided Munitions (ERGM), a 63km range, rocket assisted, GPS guided gun munitions. This is classed as a DPICM type.

2. Naval Cruise Missile (NCM), a GPS guided cruise missile with unitary warhead.

3. Naval Land Attack Missile (NLAM), a modified naval standard missile with a unitary warhead.

All munitions selection windows include the new munitions.

C. Naval Guidance.

1. Naval Gun, Naval Missile and Naval Cruise Missile are now systems in guidance and intervention.

2. Attack methods and Naval restrictions as well as FS system buffer distance include the new systems.

D. Attack Analysis. Attack analysis for the missiles determines volume of fire based on volume requested or default of 1 missile.

E. JMCIS Interface. When a Naval Unit is received and auto created via the JMCIS interface, the detailed unit data is auto populated with the template weapon systems based on the Class and hull number in the JMCIS alias.

Appendix C:
Supporting Comm Settings

Protocol	Media	Data Encoding	Data Rates (bps)
TACFIRE	SINCGARS ICOM	FSK 1200/2400	600, 1200
		FSK 1300/2100	600, 1200
		NRZ	600, 1200, 2400, 4800, 16K
	Local Radio	FSK 1200/2400	600, 1200
		FSK 1300/2100	600, 1200
	KY-57	FSK 1200/2400	600, 1200
		FSK 1300/2100	600, 1200
		NRZ	600, 1200, 2400, 4800, 16K
	2 Wire	FSK 1200/2400	600, 1200
		FSK 1300/2100	600, 1200
		CDP	8K, 16K, 32K
	2 Wire Switched	FSK 1200/2400	600, 1200
		FSK 1300/2100	600, 1200
	4 Wire	FSK 1200/2400	600, 1200
		FSK 1300/2100	600, 1200
	4 Wire Switched	FSK 1200/2400	600, 1200
		FSK 1300/2100	600, 1200
	GRA-39A	FSK 1200/2400	600, 1200
		FSK 1300/2100	600, 1200

Protocol	Media	Data Encoding	Data Rates (bps)
	GRA-6	FSK 1200/2400	600, 1200
		FSK 1300/2100	600, 1200
	DNVT-1035	NRZ	600, 1200
	DNVT-1042	NRZ	600, 1200
	DSVT-MSRT	NRZ	600, 1200
VMF	SINCGARS ICOM	NRZ	600,1200,2400,4800,16K
		FSK 1200/2400	600, 1200
		FSK 1300/1700	600
		FSK 1300/2100	600, 1200
		FSK 1575/2425	600, 1200
	Local Radio	FSK 1200/2400	600, 1200
		FSK 1300/1700	600
		FSK 1300/2100	600, 1200
		FSK 1575/2425	600, 1200
	KY-57	NRZ	16K
		FSK 1200/2400	600, 1200
		FSK 1300/1700	600
		FSK 1300/2100	600, 1200
		FSK 1575/2425	600, 1200
	KG-84A	NRZ	600, 1200
	2 Wire	CDP	8K, 16K, 32K
		FSK 1200/2400	600, 1200
		FSK 1300/1700	600
		FSK 1300/2100	600, 1200
		FSK 1575/2425	600, 1200

Protocol	**Media**	**Data Encoding**	**Data Rates (bps)**
	2 Wire Switched	FSK 1200/2400	600, 1200
		FSK 1300/1700	600
		FSK 1300/2100	600, 1200
		FSK 1575/2425	600, 1200
	4 Wire	CDP	8K, 16K, 32K
		FSK 1200/2400	600, 1200
		FSK 1300/1700	600
		FSK 1300/2100	600, 1200
		FSK 1575/2425	600, 1200
	4 Wire Switched	FSK 1200/2400	600, 1200
		FSK 1300/1700	600
		FSK 1300/2100	600, 1200
		FSK 1575/2425	600, 1200
	GRA-39A	FSK 1200/2400	600, 1200
		FSK 1300/1700	600
		FSK 1300/2100	600, 1200
		FSK 1575/2425	600, 1200
	GRA-6	FSK 1200/2400	600, 1200
		FSK 1300/1700	600
		FSK 1300/2100	600, 1200
		FSK 1575/2425	600, 1200
	DNVT-1035	NRZ	600, 1200, 16K
	DNVT-1042	NRZ	600, 1200, 16K
	DSVT-MSRT	NRZ	16K

Protocol	Media	Data Encoding	Data Rates (bps)
NATO	SINCGARS ICOM	FSK 1575/2425	600,1200
	Local Radio	FSK 1575/2425	600,1200
	KY-57	FSK 1575/2425	600,1200
	2 Wire	FSK 1575/2425	600,1200
	2 Wire Switched	FSK 1575/2425	600,1200
	GRA-39A	FSK 1575/2425	600,1200
	GRA-6	FSK 1575/2425	600,1200
EPLRS	EPUU	NRZ	600, 1200, 2400, 4800, 8K, 9600, 16K, 19200, 24K, 32K
		CDP	600, 1200, 2400, 4800, 8K, 9600, 16K, 19200, 24K, 32K
LAN	N/A	N/A	N/A (Approx. 10 Million)
MPN LAN	N/A	N/A	N/A
MCS	SINCGARS ICOM	NRZ	600, 1200, 2400, 4800, 16K
		FSK 1200/2400	600, 1200
		FSK 1300/1700	600
		FSK 1300/2100	1200
	Local Radio	FSK 1200/2400	600, 1200
		FSK 1300/1700	600
		FSK 1300/2100	1200

Protocol	Media	Data Encoding	Data Rates (bps)
	KY-57	NRZ	16K
		FSK 1200/2400	600, 1200
		FSK 1300/1700	600, 1200
		FSK 1300/2100	600, 1200
	KG-84A	NRZ	16K, 32K
	2-Wire	CDP	8K, 16K, 32K
		FSK 1200/2400	600, 1200
		FSK 1300/1700	600, 1200
		FSK 1300/2100	600, 1200
	2-Wire Switched	FSK 1200/2400	600, 1200
		FSK 1300/1700	600, 1200
		FSK 1300/2100	600, 1200
	4 Wire	CDP	8K, 16K 32K
		FSK 1200/2400	600, 1200
		FSK 1300/1700	600, 1200
		FSK 1300/2100	600, 1200
	4 Wire Switched	FSK 1200/2400	600, 1200
		FSK 1300/1700	600, 1200
		FSK 1300/2100	600, 1200
	GRA-39A	FSK 1200/2400	600, 1200
		FSK 1300/1700	600
		FSK 1300/2100	1200
	GRA-6	FSK 1200/2400	600, 1200
		FSK 1300/1700	600
		FSK 1300/2100	1200
	DNVT-1035	NRZ	16K, 32K

Protocol	Media	Data Encoding	Data Rates (bps)
	DNVT-1042	NRZ	16K, 32K
	DSVT-MSRT	NRZ	16K, 32K
188-220A	SINCGARS	NRZ	600,1200,2400,4800, 16K, 1200N, 2400N, 4800N, 9600N
		FSK 188C/4202A	75,150,300,600,1200
	2 Wire	CDP	16K, 32K
		FSK 188C/4202A	75,150,300,600,1200
	4 Wire	CDP	16K, 32K
		FSK 188C/4202A	75,150,300,600,1200
	Analog	FSK 188C/4202A	75,150,300,600,1200
	KY 57	FSK 188C/4202A	75,150,300,600,1200
		NRZ	16K
GDU	Local radio	N/A	N/A
	2 Wire	N/A	N/A
	2 Wire and radio	N/A	N/A
FCS	SINCGARS ICOM	NRZ	600, 1200, 2400, 4800, 16K
		FSK 1200/2400	600, 1200
		FSK 1300/2100	600, 1200
	Local Radio	FSK 1200/2400	600, 1200
		FSK 1300/2100	600, 1200

Protocol	Media	Data Encoding	Data Rates (bps)
	KY-57	NRZ	600, 1200, 2400, 4800, 16K
		FSK 1200/2400	600, 1200
		FSK 1300/2100	600, 1200
	2 Wire	CDP	8K, 16K 32K
		FSK 1200/2400	600, 1200
		FSK 1300/2100	600, 1200
	2 Wire Switched	FSK 1200/2400	600, 1200
		FSK 1300/2100	600, 1200
	4 Wire	FSK 1200/2400	600, 1200
		FSK 1300/2100	600, 1200
	4 Wire Switched	FSK 1200/2400	600, 1200
		FSK 1300/2100	600, 1200
	GRA-39A	FSK 1200/2400	600, 1200
		FSK 1300/2100	600, 1200
	GRA-6	FSK 1200/2400	600, 1200
		FSK 1300/2100	600, 1200
	DNVT-1035	NRZ	600, 1200
	DNVT-1042	NRZ	600, 1200
	DNVT-MSRT	NRZ	600, 1200

Appendix D: Mission Procedures

The following gives procedures for performing various fire mission types with AFATDS. These procedures focus on the location at which certain activities take place: for example, the sensor originates a call for fire, and the FSE processes it. In most cases an activity can be initiated from an AFATDS terminal as well as from a sensor device; in these cases, the step number is shown as Xa for the external device and Xb for the AFATDS (e.g., 3a and 3b), one and only one of these steps should be chosen. The AFATDS step is shown lightly shaded.

As an example, shading is shown like this.

1. Initiating and Processing Fire Missions (non-ATACMS)

1.1. Initiate and Process a Fire Mission

- For Immediate missions, set PRI(ority)=1-URGENT. When Priority is Urgent, the mission is Immediate Smoke if the FFE Shell is Smoke, otherwise the mission is Immediate Suppression.
- For Copperhead target of opportunity, set the FFE Shell to CPH.
- For Quick Smoke, set the FFE Shell to Smoke.
- Set mission type appropriately.
- If FR SHIFT format is used, the target number or known point must exist at the FSE.

IMPORTANT!!
If an observer creates a fire mission using a Package 10 fixed format message, i.e. a FOS, the observer does not have to enter a target altitude. In these cases the target altitude will default to the altitude of the observer or the OPFAC altitude if the altitude of the observer is unknown. The AFATDS operator should determine the altitude of the target and enter it prior to sending the fire mission.

No.	Location	Device	Action
1a.	Sensor	FIST DMD, FED or DMD	Observer sends FR GRID, FR LASER, FR POLAR, or FR SHIFT to FSE, or see No. 1b.
1b.	FSE, FA CP, or FU	AFATDS	AFATDS operator initiates fire mission with the Initiate Fire Mission window. • Location can be specified by grid, laser, polar or shift.
2.	FSE, FA CP, or FU	AFATDS	AFATDS will process the mission. If intervention is on, the mission will appear in the Mission Toolbar window. Go to section 5 to action the intervention.
3.	Mission Observer	AFATDS, FIST DMD, FED or DMD	AFATDS will automatically send an MTO to the observer.
4.	FU	BCS or FDS	If option chosen, AFATDS will send an FM; CFF to the BCS or FDS. The operator will process the message and send fire commands. If to FDS, go to step 8.
5.	FU	BCS	BCS operator sends FM;FOCMD to AFATDS for SHOT
6.	Mission Observer	AFATDS, FIST DMD, FED or DMD	COMMAND of SHOT message will automatically be sent to observer of mission.
7.	Mission Observer	AFATDS, FIST DMD, FED or DMD	If Mission type was Adjustment, go to section 1.2.
8.	FU	BCS or FDS	BCS operator sends FM;FOCMD, or FDS operator sends AFU;OPSTAT to AFATDS for RDS COMPLETE.

No.	Location	Device	Action
9.	Mission Observer	AFATDS, FIST DMD, FED or DMD	RDS COMPLETE COMMAND message will be sent to observer of mission.
10.	Mission Originator	AFATDS, FIST DMD, FED or DMD	If cannon mission, FFE phase complete, and Repeat FFE desired, initiate RFFE, otherwise continue with EOM.
11a.	Sensor (Observer)	FIST DMD, FED or DMD	Observer will send EOM&SURV to FSE to end mission, with Record as Target (RAT) marked if appropriate, or see No. 11b.
11b.	FSE, FA CP, or FU (Observer)	AFATDS	AFATDS operator will use End of Mission window to end mission with RAT marked if appropriate.
12.	FSE, FA CP, or FU	AFATDS	AFATDS will process the EOM. • The target will be taken off of the Active Target List and placed on the Inactive Target List. • If RAT is specified, the target will also be placed on the On-Call Target List. If FDS, the procedure is done. If BCS, AFATDS will send the EOM to the BCS.
13.	FU	BCS	The BCS operator will receive an FM;CFF with • EOM=X and will execute it.
14.	Sensor, FSE, FA CP and FU	AFATDS, FIST DMD, FED or DMD	Mission Fired Report will be sent to all units involved in the mission chain as well as their supported units. MFRs also sent to units specified for MFRs in mission information routing.

1.2. Process Subsequent Commands in Adjust-Fire Phase

No.	Location	Device	Action
1a.	Sensor (Observer)	FIST DMD, FED or DMD	Observer sends SUBQ ADJ, SA LASER or SA COORD to the FSE to adjust the round, or see No. 1b.
1b.	FSE, FA CP, or FU (Observer)	AFATDS	The AFATDS operator completes the Adjust window to adjust the round.
2.	FSE, FA CP, or FU	AFATDS	AFATDS will process the ADJUST and calculate the aimpoint.
3.	FU	BCS	BCS operator will receive FM;SUBS.
4.	FU	BCS	BCS operator sends FM;FOCMD to AFATDS for SHOT
5.	Mission Observer	AFATDS, FIST DMD, FED or DMD	COMMAND of SHOT message will automatically be sent to observer of mission.
6.	Mission Observer	AFATDS, FIST DMD, FED or DMD	If further adjustment is required, go back to step 1 -- otherwise, continue with FFE phase.
7a.	Sensor (Observer)	FIST DMD, FED or DMD	Observer will send SUBQ ADJ, SA LASER or SA COORD to FSE to initiate FFE phase, or see No. 7b.
7b.	FSE, FA CP, or FU (Observer)	AFATDS	AFATDS operator will use ADJUST window to initiate FFE phase.
8.	FSE, FA CP, or FU	AFATDS	AFATDS will process the FFE.
9.	FU	BCS	The BCS operator will receive an FM;SUBS, MOC:FFE.
10.	FU	BCS	BCS operator sends FM;FOCMD to AFATDS for SHOT
11.	Mission Observer	AFATDS, FIST DMD, FED or DMD	COMMAND of SHOT message will be sent to observer of mission.

No.	Location	Device	Action
12.			Go to Step 8 of Section 1.1

2. Establishing Missions, Targets and Known Points

2.1. Establish an FPF, Adjusting if necessary

No.	Location	Device	Action
1.	Observer	AFATDS, FIST DMD, FED or DMD	Initiate, Adjust and EOM RAT the FPF location to establish as an On Call mission.
2a.	Sensor (Observer)	FIST DMD, FED or DMD	Observer sends FR GRID (or FR SHIFT with previously adjusted target number) to FSE. • PRI=ASSN FPF. or see No. 2b.
2b.	FSE, FA CP, or FU (Observer)	AFATDS	AFATDS operator initiates fire mission with the Initiate Fire Mission window. Use previously adjusted target number if appropriate. • Mission type should be set to Assign.
3.	FSE, FA CP, or FU	AFATDS	AFATDS will process the FPF. If intervention is on, the FPF will appear in the Mission Toolbar window. Go to section 5 to action the intervention.
4.	FU	BCS	If option chosen, AFATDS will send a fire order to the BCS. The BCS will receive an FM;CFF with CONTROL1:DNL and ASNFPF:X. The operator will execute the message. The FPF has been established.
5.	Observer	AFATDS, FIST DMD, FED or DMD	AFATDS sends MTO to observer.

2.2. Establish Pre-Planned Copperhead Mission

No.	Location	Device	Action
1a.	Sensor (Observer)	FIST DMD, FED or DMD	Observer sends FR GRID to FSE. • SHELL/FZ=COPPERHEAD • CONTROL=DNL or see No. 1b.
1b.	FSE, FA CP, or FU (Observer)	AFATDS	AFATDS operator initiates fire mission with the Initiate Fire Mission window. • Mission type should be set to Assign. • Set FFE Shell to CPH.
2.	FSE, FA CP, or FU	AFATDS	AFATDS will process the Assign CPH. If intervention is on, the Assign CPH will appear in the Mission Toolbar window. Go to section 5 to action the intervention.
3.	Mission Observer	AFATDS, FIST DMD, FED or DMD	AFATDS will automatically send an MTO to the observer.
4.	FU	BCS	If option chosen, AFATDS will send a fire order to the BCS. The BCS will receive an FM;CFF with • MF1=DNL • FPF=X The operator will execute the message. The CPH mission has been established.

2.3. Establish On Call Target

- The AFATDS operator can establish an On Call target at any time by going to the Current On Call Target List and creating a new target.

No.	Location	Device	Action
1.	Sensor (Observer)	FIST DMD, FED or DMD	Observer sends FR GRID, FR LASER, FR POLAR or FR SHIFT to FSE. • CONTROL = SPECIAL ON-CALL • PRIORITY = NORMAL or see No. 2.
2.	FSE, FA CP, or FU	AFATDS	AFATDS will process the new target.
3.	Mission Observer	FIST DMD, FED or DMD	AFATDS will automatically send an MTO to the observer.

2.4. Establish Known Point from Previously Established Target

- This procedure requires that the observer's FSE has the target number in one of its target lists. If it does not, an MTO will be returned with DENY indicated.
- The AFATDS operator may create a known point at any time by going to the Known Points window and creating a new known point.

No.	Location	Device	Action
1.	Sensor (Observer)	FIST DMD, FED or DMD	Observer sends FR QUICK with • KNPT=ASSN KNPT • TGT NO filled out or see No. 2.
2.	FSE, FA CP, or FU	AFATDS	AFATDS will process the known point.
3.	Sensor (Observer)	FIST DMD, FED or DMD	AFATDS will automatically send an MTO to the sensor.

3. Initiate and Process Illumination Mission

No.	Location	Device	Action
1a.	FR GRID, FR LASER, FR POLAR, or FR SHIFT	FIST DMD, FED or DMD	Observer initiates FR GRID, FR LASER, FR POLAR, or FR SHIFT. • SHELL/FZ=ILLUM Observer transmits the call for fire to the FSE, or see No. 1b.
1b.	Initiate Call for Fire Method of Engage.	AFATDS	AFATDS operator initiates fire mission. • In Method of Engagement, ensure Adjust Shell/Fz, if required, and FFE 1 Shell/Fz is Illum/Time.
2.	FSE, FA CP, or FU	AFATDS	Continue with section 1, step 2.

4. Executing Preplanned Missions

4.1. Execute (Fire, End and Delete) an FPF Mission

In AFATDS, an FPF can be established, fired and deleted. The FPF cannot be ended; that is, once fired, the FPF can only be deleted and will not remain at the BCS. In order for the FPF to be fired again, the observer must re-establish the FPF after firing and deleting.

No.	Location	Device	Action
1.	Sensor (Observer)	FIST DMD, FED or DMD	To fire the FPF, the observer sends an FR QUICK to the FSE with • KNPT=FIRE FPF • TGT NO=target number of FPF

No.	Location	Device	Action
2.	FU	BCS	AFATDS will send an FM;QF to the BCS with • FIRE=X • FPF=X The BCS operator will execute the message and send the firing commands to the guns.
3.	Sensor	FIST DMD, FED, or DMD	To end the FPF, the sensor sends an FR QUICK to the FSE with • KNPT=END FPF.
4.	FSE, FA CP, or FU	AFATDS	The FPF will be ended and changed from an Active target to Inactive.
5.	FU	BCS	BCS operator receives and executes FM;QF with • DELETE=X • FPF=X

4.2. Execute (Fire and End) a Preplanned Copperhead Mission

No.	Location	Device	Action
1a.	Sensor	FIST DMD, FED or DMD	Observer sends FR QUICK to FSE. • KNPT=FIRE CPH or see No. 1b.
1b.	FSE, FA CP, or FU	AFATDS	AFATDS operator opens Active Target List and sends a Fire command for the CPH target number to the fire unit.
2.	FSE, FA CP, or FU	AFATDS	AFATDS will process the Fire CPH.

No.	Location	Device	Action
3.	FU	BCS	The BCS operator will receive and execute an FM;QF with • FIRE=X • CPH=X
4.	FU	BCS	BCS operator sends FM;FOCMD to AFATDS for SHOT
5.	Mission Observer	AFATDS, FIST DMD, FED or DMD	COMMAND of SHOT message will be sent to observer of mission.
6.	FU	BCS	BCS operator sends FM;FOCMD to AFATDS for DESIGNATE
7.	Mission Observer	AFATDS, FIST DMD, FED or DMD	DESIGNATE COMMAND message will be sent to observer of mission.
8.	FU	BCS	BCS operator sends FM;FOCMD to AFATDS for RDS COMPLETE
9.	Mission Observer	AFATDS, FIST DMD, FED or DMD	RDS COMPLETE COMMAND message will be sent to observer of mission.
10.	Mission Observer	AFATDS, FIST DMD, FED or DMD	To Repeat FFE, continue -- otherwise go to step 13.
11a.	Sensor (Observer)	FIST DMD, FED or DMD	To Repeat FFE, observer sends FR QUICK to FSE. • KNPT=FIRE CPHD or see No. 11b.
11b.	FSE, FA CP, or FU	AFATDS	To Repeat FFE, AFATDS operator opens Active Target List and sends a Fire command for that target number to the fire unit.
12.	Mission Observer	AFATDS, FIST DMD, FED or DMD	Go to step 6.

No.	Location	Device	Action
13a.	Sensor (Observer)	FIST DMD, FED or DMD	To end the CPH mission, the observer will send EOM&SURV to FSE, with Record as Target (RAT) marked if appropriate, or see No. 13b.
13b.	FSE, FA CP, or FU	AFATDS	AFATDS operator will use End of Mission window to end CPH mission with RAT marked if appropriate.
14.	FSE, FA CP, or FU	AFATDS	AFATDS will process the EOM and send to BCS. • The target will be taken off of the Active Target List and placed on the Inactive Target List.
15.	FU	BCS	The BCS operator will receive and execute an FM;CFF with • EOM=X
16.	Sensor, FSE, FA CP, and FU	AFATDS, FIST DMD, FED or DMD	Mission Fired Report will be sent to all units involved in the firing of the mission, their supported units, and units specified in MFR routing.

4.3. Execute On Call Fire Mission

- The target number must exist at the observer's FSE or at the AFATDS location the message is being initiated at.

No.	Location	Device	Action
1a.	Sensor	FIST DMD, FED or DMD	Observer sends FR QUICK with the previously established target number to the FSE or see No. 1b.
1b.	FSE, FA CP, or FU	AFATDS	AFATDS operator initiates fire mission, entering target number of previously established target.
2.	FSE, FA CP, or FU	AFATDS	Continue with section 1, step 2.

4.4. Execute Fire Mission by Using Previously Recorded Known Point

- The known point number used must exist at the observer's FSE.

No.	Location	Device	Action
1a.	Sensor	FIST DMD, FED or DMD	Observer sends FR SHIFT to FSE or see No. 1b.
1b.	FSE, FA CP, or FU	AFATDS	AFATDS operator initiates fire mission, entering location as Shift from known point.
2.	FSE, FA CP, or FU	AFATDS	Continue with section 1, step 2.

5. Action Intervention

No.	Action
1.	Open the Mission Toolbar by clicking the Tool Box on the main Tool Bar.
2.	If the IP symbol's counter indicates one or more interventions present, click the IP symbol.
3.	If more than one intervention was present, a list of interventions will be presented. Select one and click OK. The Intervention window will open.
4.	Note the Mission Value, Mission Precedence and Target Type.
5.	Look at the Recommendation. It may recommend denying the mission or firing the target. If it recommends firing the mission, the first option of the selected FS system will be the one chosen. Options with the same number indicate massed fire. GREEN and YELLOW gumballs indicate capable options, although YELLOW indicates that coordination is required. A RED gumball indicates that attack options exist but no capable options exist for the system and a BLACK gumball indicates that no attack options exist for that FS system.
6.	To comply with the recommendation, select the OK button. The Intervention window will close. Go to step 2.

No.	Action
7.	To select a non-recommended, capable attack option, select that option and select Send. The Intervention window will close. Go to step 2.
8.	To send an Order to Fire or Fire Order to any unit, select "Options | OTF/FO". Fill out the OTF/FO window and select Send. The Intervention window will close. Go to step 2.
9.	To cause an Unsupportable to be sent to your command HQ, select Unsupportable. The Intervention window will close. Go to step 2.
10.	To Deny the mission, select Deny. The Intervention window will close. Go to step 2.
11.	To view non-capable attack options, select "Options | View Attack Options". The Attack Options window will open. All capable and non-capable options are shown on this window. Options with the same number indicate massed fire.
12.	To select an option in the Attack Options window, select the number of the option desired and select Send. The Attack Option window will close.
13.	To close the Attack Option window and return to the Intervention window, select Cancel.

6. Initiate and Process an ATACMS Fire Mission

No.	Location	Device	Action
1a.	Sensor	JSTARS	Observer send a CFF or THMTGT specifying an ATACMS mission.
1b.	FSE, FA CP, or FU	AFATDS	The AFATDS operator initiates a fire mission with an ATACMS munition with the initiate Fire Mission window. Location can be specified by grid, laser, polar, or shift.

No.	Location	Device	Action
2.	FSE, FA CP or FU	AFATDS	If the mission originated at a non-AFATDS unit, this AFATDS unit will assume control of the mission by making this AFATDS unit the observer and notifying the non-AFATDS system that it is no longer the observer. AFATDS will also default this to an unobserved mission.
3.	FSE, FA CP, or FU	AFATDS	AFATDS will process the mission. Since it is an ATACMS mission, it will be presented at the Mission Toolbar window and require intervention at each AFATDS unit in the mission chain. Go to section 5 to action the intervention.
4.	FSE, FA CP, or FU	AFATDS	The mission will initially have a Method of Control of Warning Order, AFATDS will send the Warning Order to the next unit in the mission chain (the FDS will receive an At My Command for this mission). The mission will stay in Warning Order status until all pending coordination is complete and the operator changes the Method of Control. During this time, the operator is allowed to make updates to the target's location.
5.	FU	AFATDS	Prior to sending the mission to the FDS, AFATDS will create a PAH and TAH geometry associated with this mission and distribute it according to the distribution rules for PAH/TAH geometries. A MTO will also be sent to the mission observer.

No.	Location	Device	Action
6.	FU	FDS	FDS operator sends AFU:OPSTAT to AFATDS for RDS COMPLETE.
7.	FU	AFATDS	The RDS COMPLETE COMMAND causes the mission to be ended at AFATDS (since it is an unobserved mission). A MFR will then be automatically created and distributed through the mission chain.
8.	Observer	AFATDS	AFATDS operator will receive the MFR (it will be displayed in his "Mission Toolbar").
9.	FSE, FA CP, or FU	AFATDS	Mission Fired Report will be sent to all units involved in the firing of the mission as well as any units identified in "Mission Info Routing" at each OPFAC. Upon receipt of the MFR, any PAH/TAH geometries associated with the mission will be deleted automatically.

Appendix E:
Target Categories/Types

Thirteen (13) target categories and ninety-six (96) target types exist within AFATDS. The following table is a list of all target types as they belong to each target category.

Target Category	**Target Type**
ADA	ADA, Hvy (> 99mm)
	ADA, Med (58-99mm)
	ADA, Light (< 58mm)
	ADA, Missile
	ADA, Position Area
	ADA, Unknown
Ammunition	Ammunition Dump
C3	CP, Battalion
	CP, Division
	CP, Forward
	CP, Regiment
	CP, Small
	CP, Unknown
	Guidance Equipment
	Navigation Aids
Engineer	Bridge, Foot Pontoon
	Bridge, Veh Pontoon
	Bridge, Footbridge Raft

Target Category	Target Type
	Building, Concrete
	Building, Masonry
	Building, Metal
	Building, Spec Purpose
	Building, Unknown
	Building, Wood
	Bunker
	Pillbox
Fire Support	Arty, Hvy SP (>160mm)
	Arty, Med SP (121-160mm)
	Arty, Light SP (< 121mm)
	Arty, Towed
	Arty, Unknown
	Missle, Hvy
	Missle, Med
	Missle, Light
	Mortar, Very Hvy (> 150mm)
	Mortar, Hvy (109-150mm)
	Mortar, Med (61-108mm)
	Mortar, Light (< 61mm)
	Mortar, Unknown
	Rkt/Msl, Anti-Pers
	Rkt/Msl, AntiTank
	Rkt/Msl, Position Area
	Rkt/Msl, Unknown

Target Category	Target Type
Lift	Boat
	Ferry, Bridge
	Helicopter, Attack
	Helicopter, Cargo
	Helicopter, Obser
	Veh, Hvy Wheel (>=5T)
	Veh, Light Wheel (< 5T)
	Veh, Utility
	Aircraft
LOC	Defile
	Hill
	Landing Strip
	Railroad Segment
	Road Junction
	Road Segment
	Terrain Feature
	Bridge, Veh Concrete
	Bridge, Veh Wood
	Bridge, Veh Steel
	Bridge Site
Maneuver	AntiTank Gun
	APC
	Armored Veh
	AA, Mech Troops
	AA, Troops

Target Category	Target Type
	AA, Troops and Armor
	AA, Troops and Vehs
	AA, Unknown
	Infantry
	MG, Hvy (>=50 Cal)
	MG, Light (< 50 Cal)
	Observation Post
	Patrol
	Recoilless Rifle
	Tank, Hvy (> 120mm)
	Tank, Med (90-120mm)
	Tank, Light (< 90mm)
	Work Party
	Weapon, Crewserved
Maintenance	Supply Dump, Class I
	Supply Dump, Class II
	Supply Dump, Unknown
Nuc/Chemical	Chem Prod Complex
POL	Pretrol Prod Dump
REC	Loudspeaker Equip
	EW Equip
RSTA	Counter-Btry Radar

Target Category	Target Type
	Counter-Mortar Radar
	Dir-Finding Radar
	Ground-Surv Radar
	Search Light
	Recon Vehicle

Appendix F: Mechanics of Mission Processing

AFATDS mission processing performs the detailed computations which generate fire support attack options for received missions and targets. The computations include target processing which includes: initialization, target selection standards filtering and target duplication checks, determination of mission value, and attack analysis (AA) (which includes attack option processing; analysis of attack options and, when appropriate, operator intervention processing).

Target Processing (TP) performs a number of checks on the target information to ensure that the mission should be processed as a fire mission. These include checking the target data against target guidance to include target selection standards, checking for duplication of existing targets, whether the target is in a buildup area, and whether the target is excluded or specified for IEW routing. TP also calculates a value for incoming missions based on mission prioritization guidance. When finished, if the mission passes target processing checks then it is forwarded to Attack Analysis.

Attack Analysis (AA) processing includes determining attack options, analysis of options and operator intervention point processing. Attack analysis processing performs the computations necessary to match a new mission with the optimal attack solution based on asset capability and availability. Attack option processing determines the effects to achieve in target attack and available attack units. AA determines the capabilities of these options, if any; and ranks the combinations of units and munitions which will most effectively and efficiently engage the target. Attack analysis uses guidances to ensure that target attack is conducted in the manner best suited to the maneuver operation. If the mission meets criteria for intervention processing, then target processing, attack options and analysis results are stored for operator review and acceptance or modification of the recommended option.

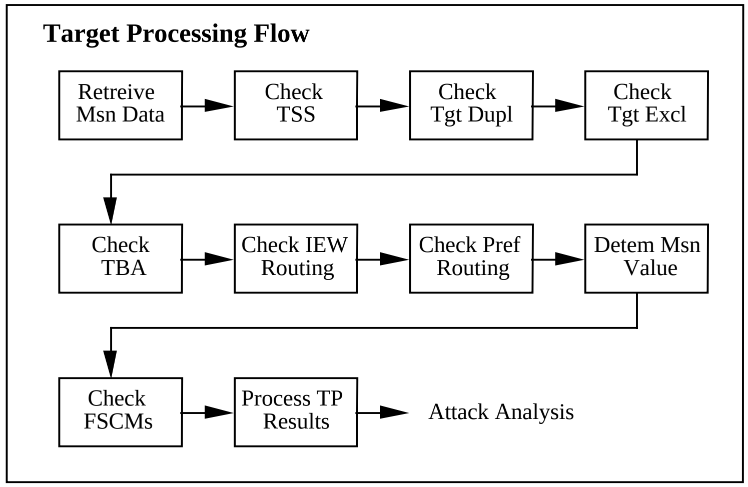


Figure F-1. Target Processing Flow

Table F-1 indicates the processing performed based on the OPFAC role and form in which the mission is received. OPFACs at different echelons, (i.e. Bn FSE, Bde FSE, and Div FSE), will usually use different guidance which will result in different target processing solutions when a mission is passed from one echelon to another.

Table F-1. Target Processing By Role and Input

Processing Unit's Role	FSE	FA CP		Fire Unit	
Message	FR	FR	OTF/FO	FR	FO
Guidance					
ATI Checking	X	X		X	
TSS	X*	X*		X*	
Duplication	X	X	X	X	X
Exclusion	X	X		X	
Target Buildup	X	X		X	
IEW Routing	X	X		X	
Immediate Routing	X				
Mission Value Calculation	X	X	X	X	X

Table F-1. Target Processing By Role and Input					
Processing Unit's Role	FSE	FA CP		Fire Unit	
Mission Cutoff Ck	X	X	X	X	X
FSCM's	X	X	X	X	X
FS Tasks Matrix	X	X	X	X	X
FS Munition Restrictions	X	X	X	X	X
FA Preference Table		X	X		
Special Tgt Alloc	X	X	X		
FSCM's	X	X	X	X	X

* TSS is only used on a CFF if the option of "Check TSS Against Calls for Fire" is chosen.

A. <u>Target Processing Filters</u>.

Target processing compares the target information associated with a mission with various filters for target processing guidance. This determines if the current target meets target selection standards, does not violate any targeting restrictions or exclusions, and can be processed for attack. The target is flagged with the result of each applicable filter check (Pass or Fail).

Target processing for missions involving special munitions such as smoke, illumination and FASCAM is limited to FSCM checks and determination of mission value.

Target processing determines if there are any coordination requirements (due to Fire Support Coordination Measures (FSCM), Zones of Responsibility (ZORs), IEW requirements, and clearance of fires criteria), determines if there is any routing requirement (for immediate suppression and smoke missions), and determines the mission value. If the Call For Fire fails one or more filter checks and intervention point criteria are not applicable to the mission, then the mission is denied and the originator is notified as part of attack analysis processing. If the target passes filter checks or applicable intervention point criteria are set, then the mission data is passed to Attack Analysis for further processing. A summary data flow of target processing is shown in Figure F-2. Descriptions of the major steps performed in target processing are provided in the following paragraphs.

These describe the processing that would be performed at an FSE on a mission initiated by an observer, the operator, or another FSE and are illustrative of the processing performed for other OPFAC roles and mission input forms, where applicable.

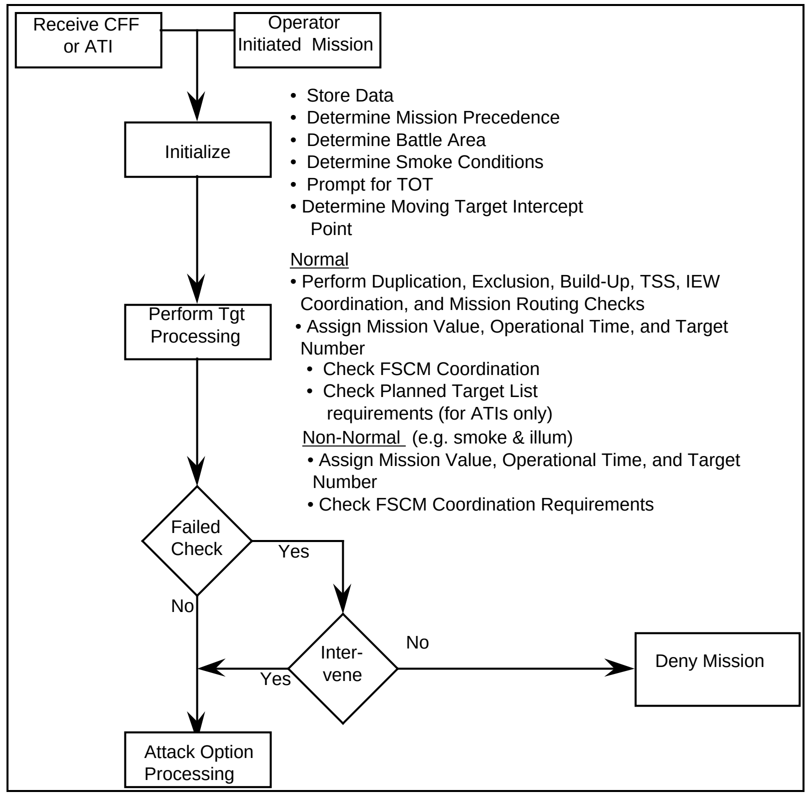


Figure F-2. Summary Target Processing Data Flow

1. GET Target Information.

When a mission is received at an OPFAC, the first step in target processing (TP) is to determine the type of mission received and get the information required to perform TP. Initialization processing accepts sensor reports and fire requests and includes checks to determine mission precedence, the geometry area in which the target is located, prompts for the operator to input TOT and smoke conditions, when appropriate, and the intercept point for a moving target. This information includes the kind of request that originated the current mission (ATI or CFF) and the mission precedence (priority, immediate, or as-acquired). An ATI for a target type that is

HPT and has a TMM precedence of As Acquired or Immediate is automatically converted into a Call For Fire with a method of engagement of Fire For Effect (FFE) which originates at the OPFAC receiving it. This description illustrates the processing for a FSE FR mission with as-acquired precedence. Next, TP begins its comparisons of the target information with the various TP filters.

2. Target Selection Standards.

   The first filter check in TP is for Target Selection Standards (TSS) which determines if the current mission qualifies as a target. The TSS check insures that fire support attack resources are not wasted on targets that are poorly located or too old. Missions originating as ATIs are always checked against TSS. Calls For Fire are only checked if the "Check Calls for Fire against TSS" check box in the TSS Guidance entry window is selected. The target type, the time acquired, whether the mission originated as an ATI, the originator ID, and the target location error associated with that type of originator are Found for the current mission. This information is compared against TSS for Acceptable Target Location Error (TLE) and Maximum Target Age.
   The mission fails the TSS check if any of the following are true:

   - There is insufficient information entered for the sensor to accomplish the TSS check. At a minimum, the TSS check must know the Observer, TLE, and reliability of this sensor when acquiring specific target types.
   - The sensor is not reliable in acquiring the given target type.
   - The sensor TLE exceeds the maximum acceptable TLE.
   - The age of the report exceeds the max acceptable age for the given target type.

3. Target Duplication.

   Next, the current mission is compared with each target on the current active target list to determine if the current mission is a duplicate of another active target. Because a number of different sensors or observers may acquire and report the same target, this check is necessary to ensure that each target is only attacked once. This filter check Gets the Target Type and Location of the current mission then steps through the target list calculating the distance between the current target and those on the target list. This distance is compared against one of two values in the Target Duplication guidance. If the targets being compared are of similar types, then the Similar Target Duplication value is used, otherwise the Any Target Duplication value is chosen. If the distance between the targets being compared is less than the chosen Target Duplication value then the new mission is considered to be a duplicate of the target already on the list.

A target fails the duplication check if either of the following cases occurs:
- The distance between the current target and a target of similar type on the active target list is less than the distance specified in the Target Duplication-Similar Target Duplication guidance.
- The distance between the current target and any other target on the active target list is less than the distance specified in the Target Duplication-Any Target Duplication guidance.

Figure F-3 shows an example of target duplication checking. The distance between the new target (AA2052 - Arty Hvy) and the other targets on the active target list is determined and compared with Target Duplication Guidance. The inner circle depicts the maximum distance that a target of any type must fall within to be a duplication. The outer circle shows the maximum distance for targets of similar type. In this example, AA2045 is of a similar type and is within the distance specified for similar target duplication guidance, so AA2052 would be a duplicate. Also, AA2046, although not of a similar type, falls within the distance specified for any target duplication. The other targets are not duplicates.

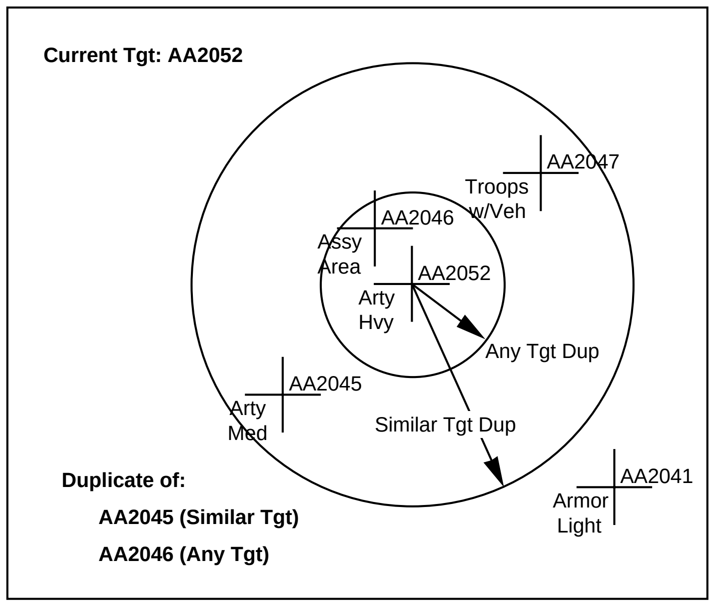


Figure F-3. Target Duplication Check

IMPORTANT!!

Immediate suppression or smoke missions are only checked against other similar mission types. Missions using special munitions (like FASCAM, Smoke, Illumination, etc.) or having a TOT time will not fail the duplication check.

4. Target Exclusion.

   Commanders may choose to exclude engagement of certain target types for a number of reasons. Fire support may not be appropriate for engaging some types of targets, another agency may be collecting information from that target (e.g., IEW may be conducting critical COMINT operations against enemy C3 elements) or some targets may not be worth attacking. The excluded target filter check compares the target type of the current target to the Excluded Target guidance to see if that target type has been excluded. If so, the mission is flagged as excluded, and processing continues with the next filter check.

5. Target Buildup Area.

   This filter check determines if the target will be flagged as being in a target buildup area. A target buildup area is established when the commander wants to allow a certain strength of targets (of a specific target type) to be acquired in a specific area before commencing engagement of targets in that area. The target location, target type, strength, and "Operational Until" time for the current mission are compared with guidance and information associated with each Target Buildup Area established for the current situation. A mission fails the TBA check if all of the following are true:

   - The target location for the current mission is located within the target buildup area.
   - The total strength of targets of this target type reported within the target buildup area plus the strength reported with this target does not meet the strength set for the TBA has not been met.
   - The Current Time - Operational Until Time period for the target overlaps the Effective Time - Expiration Time period for the target buildup area.

NOTE!

The Target Buildup filter checks are performed for incoming fire requests only. If the mission is received as an OTF or FO from another OPFAC, the filter is not used.

6. FSCM coordination requirements check.

   This check determines if there is a need for coordination of the fire mission. If geometry violations are found and any violations found have not been previously coordinated or overridden then coordination is required. Additional coordination requirements checks which are dependent upon the identification and location of a fire unit as well as the target (i.e. crossing a restrictive fire line (RFL), Air Corridor (AC) or Airspace Coordination Area (ACA)) are accomplished during attack analysis processing.

   The first step in this process is to apply the FS system effects buffer distance to the target area. The Buffer Distance is a width, in meters, surrounding the target which will be considered as though it were part of the target area. In the following illustration, Figure F-4, each of the target shapes are shown with a Buffer Distance applied.

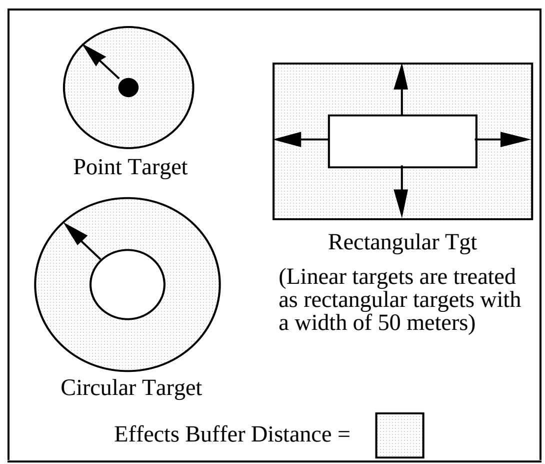


Figure F-4. FS Effects Buffer Applied to Various Target Shapes

   The buffer distance is applied to the target for each available FS system, and the buffered target is compared with each FSCM and Zone of Responsibility (ZOR) geometry (separately for each system) to see if engagement by any available FS system will violate the measure. Note that AFATDS uses the ZOR area geometries rather than unit boundary line geometries to check potential violations.

A list of violated geometries and the FS systems that require coordination is returned by this check. Violations occur in the following cases:

- The effects area associated with the target touches any part of an effective ACA, AC, or Restrictive Fire Line (RFL).
- The effects area touches any part of an effective No Fire Area (NFA).
- The effects area touches any part of an effective Restricted Fire Area (RFA). The process determines a list of restrictions (munitions, fuzes, FS Systems, FA Calibers) for the RFA.
- The supported unit of the requesting sensor or the mission originator is not the same as the establishing unit responsible for any Zone of Responsibility (ZOR) overlapped by the effects area for the target.
- Effects area touches or is beyond a Fire Support Coordination Line (FSCL) with a surface to surface attack means.
- Effects area touches or is short of the FSCL with an air attack means.
- The supported unit of the requesting sensor or the mission originator is not the same as the establishing unit responsible for any Zone of Responsibility (ZOR) overlapped by the effects area for the target.

ZOR coordination requirements are excused if:

- The entire effects area of the target is beyond a Coordinated Fire Line (CFL) within the same ZOR as the CFL establishing unit or a unit commanded by or supporting the CFL establishing unit, for surface to surface FS systems.
- The entire effects area is beyond a Fire Support Coordination Line (FSCL) within the same ZOR as the establishing unit of the FSCL for air to surface FS systems.
- The entire effects area associated with the target is within a Free Fire Area (FFA).

7. IEW Routing.

The next check in target processing determines if the target must be coordinated with IEW prior to attack. This provides IEW an opportunity to determine if the target is or should be exploited for intelligence rather than being engaged by a FS system. The target type for the current mission is compared to the Target Management Matrix - Route To IEW guidance. If this target type is flagged for IEW Routing then the mission will fail this filter check. If you choose to pursue attack of the target a coordination request will be sent to the ASAS unit specified in the "Mission Info Routing".

8. Preferred Routing.

   If a mission is an Immediate Smoke or Immediate Suppression, this filter compares the mission type with the Mission Routing guidance to determine the ID of a unit, if specified and capable, to which the mission should be routed for attack. This check is done at FSEs only. Its purpose is to speed the attack of these targets by bypassing intermediate OPFACs.

B. Mission Value Determination.

1. General.

   During target processing, AFATDS executes routines to assign a mission value to a received mission. Mission value is a number between 0 and 100 and serves two purposes. First, the mission value is used to rank order missions waiting to be attacked and second, the mission value is used to determine which fire support systems may be considered for use in attacking the target.
   Values are determined for four separate target attributes. These four values are then weighted and combined to determine the overall mission priority. The four attributes considered are as follows:

   a. Priority of Fires.
   b. Targeted Areas of Interest.
   c. On-Call Status.
   d. Type of Target.

   See the Mission Value: Concepts section of this notebook for more information.

C. Process Target Processing Results.

After performing filter checks, TP determines the actions to take based on mission information. and the results of the checks. Table F-2 shows the possible outcomes of target processing filter checks and the follow on action that results.

Table F-2. Target Disposition After Target Filtering						
Mission Orgin	Pass TSS?	Msn prec from TMM	HPT?	Pass Dup, TBA, Excl tgt (TMM) ?	Interven -tion required	Action Taken By AFATDS
FR/CFF	Yes	I or A	N/A	Yes	Yes	Perform attack analysis - send mission to IP
FR/CFF	Yes	I or A	N/A	Yes	No	Perform attack analysis - execute recommended attack option
FR/CFF	Yes	Planned	N/A	Yes	Yes	Perform attack analysis - send mission to IP (note: mission precedence will be changed to “as acquired”)
FR/CFF	Yes	Planned	N/A	Yes	No	Perform attack analysis - execute recommended attack option (note: mission precedence will be changed to “as acquired”)
FR/CFF	Yes	Any	N/A	No	Yes	Perform attack analysis - send mission to IP
FR/CFF	Yes	Any	N/A	No	No	Recommend Deny - Place in “Thumbs Down” field.

Table F-2. Target Disposition After Target Filtering						
Mission Orgin	Pass TSS?	Msn prec from TMM	HPT?	Pass Dup, TBA, Excl tgt (TMM) ?	Interven -tion required	Action Taken By AFATDS
FR/CFF	No	Any	N/A	N/A	Yes	Perform attack analysis - send mission to IP - Recommend Deny ("Failed TSS"). (accepting the deny will send this target to target generation - suspect target list)
FR/CFF	No	Any	N/A	N/A	No	Recommend Deny - Place in "Thumbs Down" field. (accepting the deny will send this target to target generation - suspect target list)
ATI	Yes	Planned	N/A	N/A	N/A	Add target to current situation Planned target list - send ATI to ASAS
ATI	Yes	I or A	Yes	Yes	Yes	Perform attack analysis - send mission to IP. (Note: This OPFAC will be the observer - mission is FFE cannot observe)

Table F-2. Target Disposition After Target Filtering						
Mission Orgin	Pass TSS?	Msn prec from TMM	HPT?	Pass Dup, TBA, Excl tgt (TMM) ?	Interven -tion required	Action Taken By AFATDS
ATI	Yes	I or A	Yes	Yes	No	Perform attack analysis - execute recommended attack option (Note: This OPFAC will be the observer - mission is FFE cannot observe)
ATI	Yes	I or A	Yes	No	N/A	Add target to current situation inactive target list - send ATI to ASAS
ATI	Yes	I or A	No	N/A	N/A	Add target to current situation inactive target list - send ATI to ASAS
ATI	No	N/A	N/A	N/A	N/A	Send target to Generate targets (Suspect target list)

D. <u>Perform Attack Analysis</u>.

In determining whether a given unit is capable of attacking a target, AFATDS performs a variety of capability checks depending upon the level (FS System, unit, detailed) of analysis.

1. Detailed attack analysis is the most complex of the three levels. Your OPFAC must have up to date information on all fire units that you want to consider. In detailed attack analysis, AFATDS looks at individual fire units to make an assessment of their capability to attack the target (either as a single unit or as part of a massing option). The logic proceeds through the following steps.

- Determine what fire units are available to consider -----> add to the "available unit list".

- Determine which of the available fire units meet basic capability criteria (e.g. are "Ready", are not restricted etc.) -----> add to the "working unit list". ID those that are not capable and place on "View Attack Options" window.

- Determine the order of munition categories (HE, NAPALM, DPICM etc.) to try for each unit on the "working unit list".

- Make a 1st pass through the unit-munition pairings and determine which units are capable (range, unit response time, munition availability etc.) with their first choice munition category.

- After the 1st pass, if one or more units are capable then stop generating attack options. If none are capable then try the 2nd choice munition category for each unit. After each pass place the capable & incapable units on the attack options window. Capable options will be placed on both the "Intervention point" window and the "View attack options" window.

- Output is a list of capable and incapable attack options.

The following figures may be useful in visualizing the logic used by AFATDS when performing detailed attack analysis:

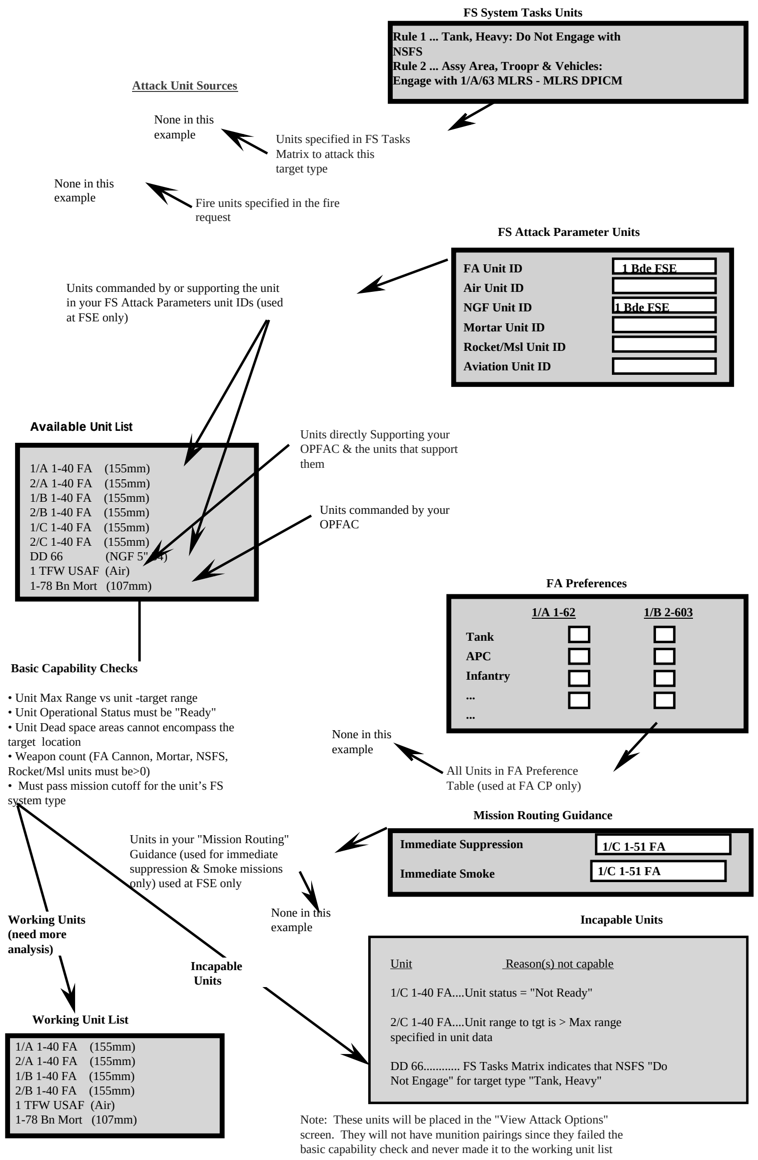


Figure F-5. Analyzing Units & Munitions in Attack Analysis (Example processing at a Bn FSE) (Figure 1 of 2)

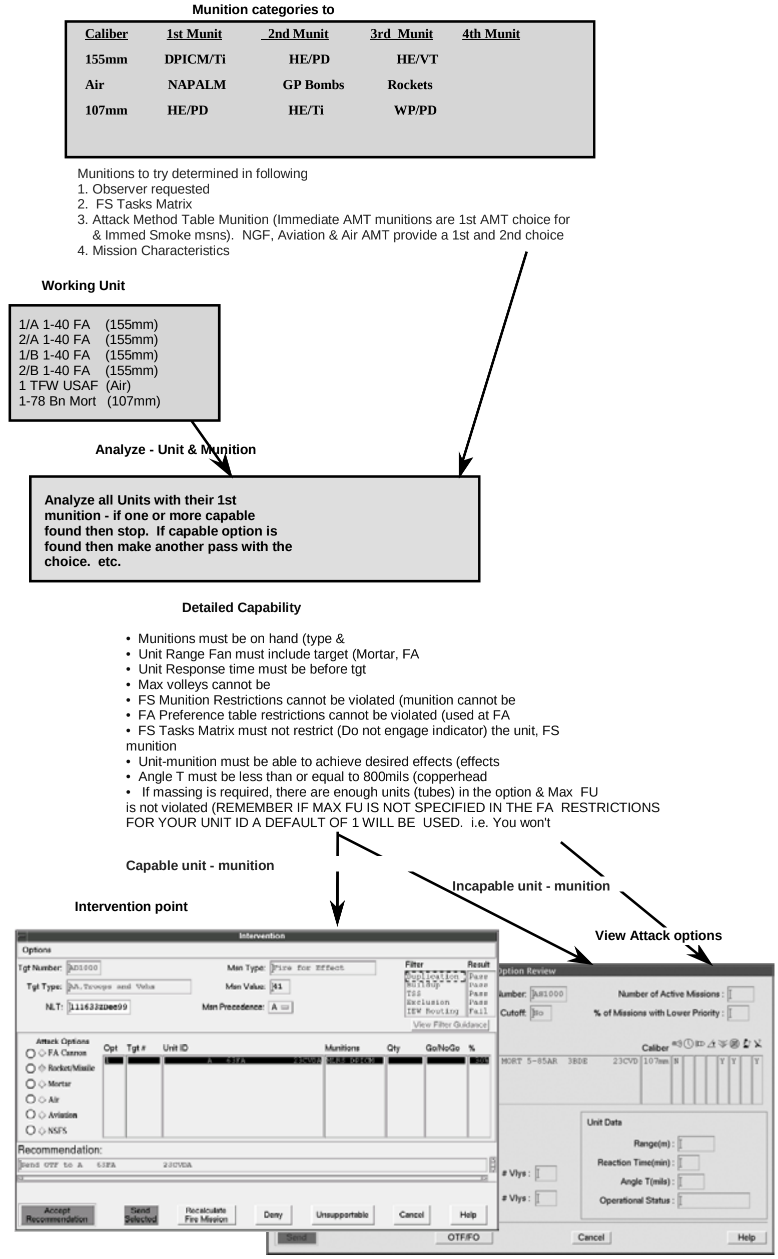


Figure F-5. Analyzing Units & Munitions in Attack Analysis (Example processing at a Bn FSE) (Figure 2 of 2)

The following discussion provides the details as to how AFATDS generates attack options.

a. Determine Available Units.

AFATDS will determine the available units and systems ("Available unit list") to consider in attack analysis. These units are dependent upon the level of attack analysis and are determined as follows:

1). At FSE, FA CP or FU. Get all fire units that directly work for (i.e. are commanded by or directly support) the local OPFAC.

2). At FSE, FA CP or FU. Get all fire units that work for the units that support your OPFAC. For example, a Bde FSE is supported by a DS FA Battalion. All fire units that work for the DS Battalion are used. NOTE: AFATDS will not attempt to use fire units that work for (directly or indirectly) supporting or subordinate FSEs (even though the Bn FSE works for the Bde FSE). This logic prevents a Bde FSE from attempting to consider and possibly task Battalion FS assets in attack analysis (tasking subordinate FSE assets would be operationally unacceptable).

3). At FSE, FA CP or FU. Get all fire units that indirectly work for the units that support your OPFAC.

- Example 1, a Bde FSE is supported by an FA Battalion. The DS battalion, in turn, is supported by another FA battalion. All fire units that work for the other Battalion are also used when the Bde FSE conducts attack analysis.

- Example 2, a DS FA CP is supported by another FA Battalion (Reinforcing - "R"). All fire units that work for the R Battalion are also used when the DS FA CP conducts attack analysis.

4). At FSE, FA CP or FU, get unit listed in the FS tasks rule(s) that apply to this mission. Get the fire units that work for that unit.

5). At FSE, FA CP or FU, get fire units listed in the mission data that cane with the FR/ATF/FO.

6). At FSEs. Get all fire units (Air, FA Cannon, Naval Ship, etc.) that work for the unit identified for the appropriate FS System in the FS attack parameters guidance.

- Example 1: A Bn FSE puts the "1Bde FSE" in its FS attack parameters for Air. Air assets supporting the Bde FSE would be considered at the Bn FSE during attack analysis.

- Example 2: A Bde FSE puts the "Div FSE" in its FS attack parameters for Naval gun. Naval gun assets directly supporting the Div FSE would be considered at the Bde FSE during attack analysis.

- Example 3. A Bn FSE puts "1 Bde FSE" in its FS attack parameters for FA cannon, fire units supporting the Bde FSE directly (or indirectly through an FA CP supporting the Bde FSE) would be considered at the Bde FSE during attack analysis.

7). At FSEs. Get the units listed in the Mortar & FA Immediate mission routing table ("Mission Routing" guidance). Use these units when analyzing Immediate Suppression or Immediate Smoke missions. Important note: If one of the units listed in this guidance is selected as the attack option for an Immediate Suppression or Immediate Smoke mission, the FSE will attempt to route the mission directly to that fire unit (not to another FSE or to an FA CP).

8). At FA CPs. Get all fire units listed in the FA Preference table. If Air , Naval ship, Mortar or FA fire units are listed in the FA preference table they will be considered available for use in attack analysis.

b. Determine Working Units.

AFATDS then creates a "Working unit list" that contains units that pass certain basic capability criteria (e.g. units that are "not ready" will not be further analyzed, units that have a weapon type inappropriate for the mission type (like "Air" units for an "Immediate Suppression" mission) will not be further analyzed). The explanation as to how these units are determined is discussed below.

1). Air and Aviation Units. Eliminate any of the Air or Aviation fire units determined above from further consideration based on the following:

- If the unit has operational status not equal to "Ready".

- If the mission parameters match any one of the following cases, all Air and Aviation units will be eliminated from further consideration (ID as "Inappropriate system"):

    - Mission Precedence of "Priority".
    - Mission Type is not "FFE".

- If the Air or Aviation unit has a dead space area that includes the target location (ID as "range Incapable").

- If Air or Aviation FS system the specific air or aviation fire unit is indicated as "Do Not Engage" in the FS tasks matrix for the given target type.

- If the Air or Aviation unit is indicated as "Restricted" in the FA Preference table for the given target type and the OPFAC doing this processing is an FA CP (ID as "Restricted Unit").

2). Naval Ship Units. Eliminate any of the Naval Ship units determined above from further consideration based on the following:

- If the Naval Ship unit has operational status not equal to "Ready".

- If the mission parameters match any one of the following cases, all Naval Ship units will be eliminated from further consideration (ID as "Inappropriate system"):

    Immediate Smoke mission type.
    Immediate Suppression mission type.
    Mission Precedence of "Priority".

- If the Naval Ship unit has a dead space area that includes the target location (ID as "range Incapable").

- If Naval Ship FS system or the specific Naval Ship fire unit is indicated as "Do Not Engage" in the FS task matrix for the given target type (ID as "Restricted Unit").

- If the Naval Ship unit is indicated as "Restricted" in the FA Preference table for the given target type and the OPFAC doing this processing is an FA CP. (ID as "Restricted Unit").

- If Naval Ship unit has tube count = "0" (ID as "Munition incapable").

- If the Naval Ship unit's range fan does not cover the target (ID as "Range Incapable").

3). Mortar Units. Eliminate any of the Mortar fire units determined above from further consideration based on the following:

- If the Mortar unit has operational status of not equal to "Ready".

- If the Mortar unit has a dead space area that includes the target location (ID as "range Incapable").

- If Mortar FS system or specific mortar unit is indicated as "Do Not Engage" in the FS task matrix for the given target type (ID as "Restricted Unit").

- If the Mortar unit is indicated as "Restricted" in the FA Preference table for the given target type and the OPFAC doing this processing is an FA CP. (ID as "Restricted Unit").

- If Mortar unit has tube count = "0" (ID as "Munition incapable").

- If Mortar Unit's Range fan does not cover the target (ID as "Range Incapable").

4). FA Cannon Units. Eliminate any of the Cannon fire units determined above from further consideration based on the following:

- If the Cannon unit has operational status not equal to "Ready".

- If the Cannon unit has a dead space area that includes the target location (ID as "range Incapable").

- If FA Cannon FS system or specific cannon fire unit is indicated as "Do Not Engage" in the FS task matrix for the given target type (ID as "Restricted Unit").

- If the Cannon unit is indicated as "Restricted" in the FA Preference table for the given target type and the OPFAC doing this processing is an FA CP. (ID as "Restricted Unit").

- If Cannon unit has tube count = "0" (ID as "Munition incapable").

- If Cannon Unit's Range fan does not cover the target (ID as "Range Incapable").

5). Rocket/Missile Units. Eliminate any of the Rocket/Missile fire units determined above from further consideration based on the following:

- If the Rocket/Missile unit has operational status not equal to "Ready".

- If the mission type is not "FE", all Rocket/Missile units will be eliminated from further consideration (ID as "Inappropriate system").

- If the Rocket/Missile unit has a dead space area that includes the target location (ID as "range Incapable").

- If Rocket/Missile FS system or specific Rocket/Missile fire unit is indicated as "Do Not Engage" in the FS tasks matrix for the given target type (ID as "Restricted Unit").

- If the Rocket/Missile unit is indicated as "Restricted" in the FA Preference table for the given target type and the OPFAC doing this processing is an FA CP. (ID as "Restricted Unit").

- If Rocket/Missile unit has tube (weapon) count = "0" (ID as "Munition incapable").

- If Rocket/Missile Unit's Range fan does not cover the target (ID as "Range Incapable").

c. Determine Munition Category to Try.

AFATDS takes the FR/OTF and determines the munition categories to try for each possible caliber:

1). Get the munition category (e.g. WP, NAPALM, DPICM) specified in the Fire Request or OTF/FO. Each caliber that is characteristically capable of firing that category will have that munition as the 1st to try. For example, the following caliber's can fire WP:

155mm
105mm
81mm
107mm

Note: If "DPICM" is requested, "MLRS DPICM" will be tried first for rocket units.

2). If the requested munition is ATACMS, EFOGM, Copperhead, Illumination, Smoke, or FASCAM, AFATDS will not try any other munition type. In this case, if the requested munition is not capable then no other attack options are developed.

3). If one or more of the caliber's cannot characteristically fire the specified munition (e.g. a 203mm unit cannot fire WP), the 1st Munition to try for that caliber is extracted from the FS tasks matrix or the appropriate attack methods table. For example, if the FA Cannon AMT specified DPICM, the 203mm caliber units would have DPICM as the 1st munition to try.

4). If one or more of the caliber's still does not have a munition to try, then the Mission Characteristics table is accessed to select a munition category. The mission characteristics table is based on the mission type - target type - effects desired - FS system - weapon caliber - Munition category 1 - Munition category 2 - Munition category 3 etc.

5). AFATDS will attempt to keep a mission as a "volleys"/"rounds" mission if a specific volume of fire is requested or specified in the amount. See Important notifications below.

IMPORTANT!!

AFATDS will attempt to carry requested volume of fire (e.g. 2 volleys) through for other munitions that is tries. For example, if HE/VT 2 volleys was requested, it will be the first munition to try. The second munition (e.g. HE/PD will also be tried with 2 volleys.

IMPORTANT!!

When a volume of fire is specified for a "volleys" munition (like DPICM), AFATDS will assign a round quantity for corresponding rocket units firing MLRS DPICM.

d. Determine Attack Options-Overview.

Now that AFATDS has a list of working units - along with munition categories to try, it will begin to generate attack options. Important Note: When conducting attack analysis, AFATDS will make a 1st pass through the working unit list using the 1st munition category for each unit. If one of the options (in any FS system or of any caliber) is determined as capable during that pass, then AFATDS will not generate additional options. For example:

- FR on target type "POL Dump" received.
- FR stated that "DPICM/Time" was munition/fuze to use on POL Dump.
- FA Cannon AMT lists "WP/PD" as munition/fuze to use on POL Dump.
- Air AMT lists "Napalm" as 1st choice munition to use on POL Dump.
- Naval Gun AMT lists "5in 54 - HE" as 1st choice munition/fuze to use on POL Dump.
- Mortar AMT has no munition/fuze to use on POL Dump.
- Following units (from working unit list) are to be analyzed (with the indicated 1st choice munition category for the unit caliber's):

Unit	Cal	Munit	Munit Source	Remarks
1/A 1-40 FA	155mm	DPICM	Specified in FR/OTF	DPICM used because observer requested it and 155mm is characteristically capable of firing DPICM
2/A 1-40 FA	155mm	DPICM	Specified in FR/OTF	DPICM used because observer requested it and 155mm is characteristically capable of firing DPICM
1/A 3-34 FA	203mm	DPICM	Specified in FR/OTF	DPICM used because observer requested it and 203mm is characteristically capable of firing DPICM
2/A 3-34 FA	203mm	DPICM	Specified in FR/OTF	DPICM used because observer requested it and 203mm is characteristically capable of firing DPICM
1 TFW USAF	Air	Napalm	Air AMT	Since Air can not fire WP, the Air AMT was used to get munition for Air unit
DD 78	Naval Gun-5" 54	HE	Specified in Naval Gun AMT	HE is extracted from Naval Gun AMT because 5" 54 is not characteristically capable of firing DPICM

Unit	Cal	Munit	Munit Source	Remarks
1-5 Bn Mortars	120mm	HE	Mission Characteristics	HE is extracted from Naval Gun AMT because 120 mm mortar is not characteristically capable of firing DPICM and no entry was in mortar AMT

- After the first pass through the working units, AFATDS determines the following:

Unit	Cal	Munit	Result
1/A 1-40 FA	155mm	DPICM	Not-Capable
2/A 1-40 FA	155mm	DPICM	Capable
1/A 3-34 FA	203mm	DPICM	Not-Capable
2/A 3-34 FA	203mm	DPICM	Not-Capable
1 TFW USAF	Air	Napalm	Capable
DD 78	Naval Gun-5"	HE	Not-Capable
1-5 Bn Mortars	120mm	HE	Capable

- Since at least one unit was determined capable (in this case there were three), AFATDS will not attempt a 2nd pass with different munitions (IT WILL STOP GENERATING OPTIONS!). The three capable options will be looked at IAW the attack option ranking criteria and one of them recommended. In this case the Air unit option was generated from the Air AMT (thus this option is "Operator specified" since the guidance drove the solution). The 155 mm option was generated from the observers request (thus this option is

"Observer specified"). The Mortar unit option was generated from the mission characteristics table. If the attack option ranking had "observer/operator specified" as the highest ranked parameter, the 155 mm option would be recommended. Had the ranking scheme been set to have "Mission Characteristics" as the highest ranked parameter, then the Mortar option would be recommended.

- Note: If no capable options were determined on the 1st pass through the working units, AFATDS will try again using the 2nd choice munition for each unit. The 2nd choice munitions are determined just like the 1st choice (AFATDS will simply extract the next munition category from the AMTs or mission characteristics). In our example, if AFATDS had to make a 2nd pass, the 155mm munition category to try would be retrieved from the FA AMT (since the 1st try used the Specified munition). The DD-78 unit would have its munition retrieved from the mission characteristics table (since we already tried the Naval Gun AMT munition with this unit).

e. Analyzing the Working Units With Detailed Analysis.

When detailed analysis is performed, capability of fire units is determined as follows:

1). AFATDS sorts the units on a "Working unit list" in the following order:

- Observer/Operator Specified unit(s).
- Preferred mission routing specified in the mission routing guidance (for immediate suppression or smoke missions only).
- FS tasks matrix units (units derived from the FS tasks guidance).
- Preference table units (units derived from the unit listed in the FS attack parameters or from units listed in the FA preference table).
- Organization for combat units (units that are commanded by or support the OPFAC doing the processing).

2). AFATDS takes the first fire unit in the "Working unit list" - and gets the munition category to use for that unit (based on that unit's caliber) and determines its capability. Unit capability is determined based on the unit status, FS system type, and the current guidance. Details on how a specific unit's capability is determined are described for each FS system (see below).

3). After the first unit - munition pairing is analyzed, then AFATDS gets the next unit on the working unit list and determines its capability. This will continue until all units on the working unit list are analyzed with their first choice munition.

4). Once all units have been analyzed with their 1st choice munitions (i.e. 1st pass thru the working unit list is complete) and one or more capable options have been determined, then no further analysis will be done. The capable options will be ranked and one of them recommended by AFATDS.

5). If no capable options are found on the first pass then AFATDS will make a 2nd pass through the unit list (using the 2nd choice munition for each unit) and attempt to generate capable options. In the event that one or more units are now determined capable, attack analysis will stop and the options will be ranked. This technique will continue (i.e. AFATDS will try a 3rd, 4th etc. pass through the units) until one of the passes finds a capable unit - munition pairing. If none are found, AFATDS will stop attempting to generate options when all munition categories (based on munition characteristics) have been tried for each unit on the working unit list).

6). Air and Aviation Units: The Air unit - munition pairing will be determined capable if all of the following checks are passed:

- Munition Availability. The unit has the specified munition category (e.g. Napalm) entered in its unit data. If not, ID the unit - munition pairing as "Munitions incapable".

- Response Time. The Unit's Response time (from the "Response time" field in the unit data) + current time is less than or equal to the NLT time for the target. If the unit is not expected to attack the target in time then ID the unit - munition pairing as "Time incapable".

- Effects capability. For effects (not volley) targets only. AFATDS assumes that any Air or Aviation unit is capable of achieving any effects level on any target. Therefore air units will always be effects capable.

- Angle "T". Angle T is used as a capability check for copperhead missions only. Air or Aviation options are always capable for angle T.

- Mission Cutoff. If the value of the mission being analyzed is not greater than the Mission Cutoff value for "Air" or "Aviation" then ID the unit-munition pairing as "Mission Cutoff incapable".

- Restrictions. The tested munition cannot be restricted based on the FS munitions restrictions guidance on the FS tasks matrix ("Do not engage" indicator). If the munition is restricted then ID the Unit-Munition paring as "munitions incapable".

7). Naval Ship Units: The Naval Ship unit - munition pairing will be determined capable if all of the following checks are passed:

- Munition Availability. The unit has the required quantity of the specified munition category (e.g. HE) entered in its unit data. If not, ID the unit - munition pairing as "Munitions incapable" for this munition.

- Response Time. The Unit's Response time (from the "Response time" field in the unit data) + current time is less than or equal to the NLT time for the target. If the unit is not expected to fire in time then ID the unit - munition pairing as "Time incapable".

- Effects Capability. The unit is capable of achieving the specified effects (e.g. Destroy (30%), 40% etc.) on the target . This applies to effects missions only! Effects algorithm is used to determine volume of fire. If the unit is not expected to achieve the desired effects then ID the unit - munition pairing as "Effects Incapable" for this munition.

- Range capability. Remember the range fan was already checked when the working unit list was built. AFATDS now looks at the maximum range capability of the specific munition model being analyzed if the model's maximum or minimum range does not reach the target then the unit is range incapable.

- Angle "T". Angle T is used as a capability check for copperhead missions only. Naval Gun options are always capable for angle T.

- Mission Cutoff. If the value of the mission being analyzed is not greater than the Mission Cutoff value for "Naval Gun" then ID the unit-munition pairing as "Mission Cutoff incapable".

- Restrictions. The tested munition cannot be restricted based on the FS munitions restrictions guidance on the FS tasks matrix ("Do not engage" indicator). If the munition is restricted then ID the Unit-Munition paring as "munitions incapable".

8). Mortar Units: The Mortar unit - munition pairing will be determined capable if all of the following checks are passed:

- Munition Availability. The unit has the specified munition entered in its unit data. If not, ID the unit - munition pairing as "Munitions incapable" for this munition.

- Response Time. The Unit's Response time (from the "Response time" field in the unit data) + current time is less than or equal to the NLT time for the target If the unit is not expected to fire in time the ID the unit - munition pairing as "Time incapable".

- Effects Capability. The unit is capable of achieving the specified effects (e.g. Destroy (30%), 40% etc.) on the target . This applies to effects missions only! Effects algorithm used to determine volume of fire. If the unit is not expected to achieve the desired effects then ID the unit - munition pairing as "Effects Incapable" for this munition.

- Max Volleys. The volley quantity for the mortar unit must be less than or equal to the Max volleys specified for your OPFAC in the "Mortar restrictions guidance". If the max volleys would be violated, then ID the unit - munition pairing as "Munitions incapable".

- Massing on area targets. The Mortar Restrictions for your unit ID must specify a Max # of FUs greater than or equal to the number of segments on the target. If you do not specify "Max Volleys" for your unit, a default of "1" will be used. In other words if you do not set up this guidance you will not mass!

- Ammo on hand. The unit has enough ammunition (of the tested munition category) to fire the number of volleys in the option. If unit does not have enough of one of the models of the munition category (e.g. a mortar platoon option requires 5 volleys of HE/PD, the unit must have at least 20 rounds of an HE model - like M329A1), then ID the unit-munition pairing as "Munitions incapable".

- Range capability check. AFATDS will determine the munition model (e.g. M329A1) to use for the tested munition category (e.g. HE). The max range of that munition model is determined based on the weapon platform (e.g. M30 mortar) associated with the tested unit. If the range to target is greater than the weapon-munition model range capability then ID the unit-munition pairing as "Range incapable". Note: If the fire unit has multiple models (e.g. 1-80 Mort unit has M329A1 & M329A2) of the tested munition category (e.g. HE) in its unit data, then the model with the shortest maximum range capability will be the one used (providing the model can range the target).

- Angle "T". Angle T is used as a capability check for copperhead missions only. Mortar options are always capable for angle T.

- Mission Cutoff. If the value of the mission being analyzed is not greater than the Mission Cutoff value for "Mortar" then ID the unit-munition pairing as "Mission Cutoff incapable". This is done at FSEs only.

- Restrictions. The tested munition cannot be restricted based on the FS munitions restrictions guidance on the FS tasks matrix ("Do not engage" indicator). If the munition is restricted then ID the Unit-Munition paring as "munitions incapable".

9). Cannon Units: The Cannon unit will be determined capable if all of the following checks are passed:

- Munition Availability. The unit has the specified munition category (e.g. HE) entered in its unit data. If not, ID the unit as "Munitions incapable" for this munition.

- Response Time. At FSE only. The Unit's Response time (from the "Response time" field in the unit data) + current time is less than or equal to the NLT time for the target. If the unit is not expected to fire in time then ID the unit as "Time incapable".

- Response Time. At FA CP or FU only. The unit's response time + current time is less than or equal to the NLT time for the target. The candidate FU's response time is determined as follows:

  - Look at the precedence & value of the target being analyzed.

  - Look at the list of missions you have assigned to the candidate FU.

  - Add up the total time the FU is expected to take to fire all the active missions you assigned it that are of a higher precedence & value than the target being analyzed. The response time is computed as the total time to fire each of these missions (considering the number of volleys to be fired & the sustained rate of fire for the candidate FU). Shift times between missions are not considered during this check. For example: A target (SB2000) with a precedence of "I" and a mission value of "45" is being analyzed. Candidate FU is 1/A 1-12 FA (155mm):

    * Current time = 301200Apr95

    * SB2000 NLT = 301215Apr95 (15 min from now).

    * SB2000 precedence = "I", Value = "45".

    * Sustained rate of fire for 1/A 1-12 FA (from unit data) is 1 volley/min.

    * 1/A 1-12 has been assigned the following missions by the 1-12 FA CP

Tgt Number	Prec	Value	# volleys	Firing time (min)
SB1000	A	90	3	3
SB1001	I	45	5	5
SB1002	I	20	2	2
SB1003	A	25	2	2
SB1004	I	60	10	10
SB1005	A	30	4	4
SB1006	I	85	8	8

* There are two missions with a greater precedence & value than the current mission: SB1004 & SB1006. They have a combined firing time of 18 min (10 + 8).

* The response time for 1/A 1-12 as far as target SB2000 is concerned is 18 minutes. Since SB2000's NLT is 15 minutes from now, 1/A 1-12 would be determined response time incapable. A value of "18" would be placed on the "view attack option" screen for the 1/A 1-12 FA option.

* If a new mission (e.g. SB5555) had a precedence of "A" and a value of 30, then the firing times for the following targets would be added up to determine response time: SB1000, SB1001, SB1002, SB1004, SB1006. (Note: firing times for missions with an equal precedence & value (like SB1005) to the new target (SB5555) will not be added to produce the response time).

- When the FA CP receives an MFR or a deny on one of the missions it previously assigned a fire unit, then that fire unit's mission assignment history is updated to reflect the current active targets.

• Effects Capability. The unit is capable of achieving the specified effects (e.g. Destroy (30%), 40% etc.) on the target . This applies to effects missions only! Effects algorithm used to determine volume of fire. If the unit is not expected to achieve the desired effects then ID the unit as "Effects Incapable" for this munition.

- Max Volleys. The volley quantity for the cannon unit (as determined from the observer request, FA AMT, Effects calculation, or mission characteristics) must be less than or equal to the Max volleys specified for your OPFAC in the "FA restrictions guidance". If the max volleys would be violated, then ID the unit - munition pairing as "Munitions incapable".

- Massing on area targets. The FA Restrictions for your unit ID must specify a Max # of FUs greater than or equal to the number of segments on the target. If you do not specify "Max Volleys" for your unit, a default of "1" will be used. In other words if you do not set up this guidance you will not mass!

- Ammo on hand. The unit has enough ammunition (of the tested munition category) to fire the number of volleys in the option. If unit does not have enough of one of the models of the munition category (e.g. a FU platoon option requires 5 volleys of HE/PD, the unit must have at least 20 rounds of an HE model - like M107 and 20 compatible fuzes - like M557), then ID the unit-munition pairing as "Munitions incapable".

- Range capability check 1. If the target location falls outside of the unit range fan (beyond or outside the right or left limits), then ID the unit-munition pairing as "Range incapable".

- Range capability check 2. AFATDS will determine the munition model (e.g. M107NC) to use for the tested munition category (e.g. HE). The max range of that munition model is determined based on the weapon platform (e.g. M109A6 Howitzer) associated with the tested unit (assuming maximum propellant charge is used). If the range to target is greater than the weapon-munition model range capability then ID the unit-munition pairing as "Range incapable". Note: If the fire unit has multiple models (e.g. 1/A 1-40 FA unit has M107NC, M107DC & M795) of the tested munition category (e.g. HE) in its unit data, then the model with the minimum range will be the one used.

- RAP Munitions. AFATDS will try to use RAP munitions (if the fire unit can characteristically shoot them) when range capability checks for "normal" HE models fail. RAP munitions are not found in FA AMT tables since they should only be selected when range to target warrants their use.

- Angle "T". Angle T is used as a capability check for copperhead missions only. If the angle T for the mission is greater than 800mils, the Unit-Copperhead pairing will be incapable "Angle T Incapable".

- Mission Cutoff. If the value of the mission being analyzed is not greater than the Mission Cutoff value for "FA" then ID the unit-munition pairing as "Mission Cutoff incapable". This is done at FSEs only.

10). Rocket/Missile Units: The Cannon unit will be determined capable if all of the following checks are passed:

- Munition Availability. The unit has the specified munition category (e.g. HE) entered in its unit data (uploaded munitions). If not, ID the unit as "Munitions incapable" for this munition.

- Response Time. At FSE only. The Unit's Response time (from the "Response time" field in the unit data) + current time is less than or equal to the NLT time for the target   If the unit is not expected to fire in time the ID the unit as "Time incapable".

- Response Time. At FA CP or FU only. The unit's response time + current time is less than or equal to the NLT time for the target. The candidate FU's response time is determined as follows:

  - Look at the precedence & value of the target being analyzed.

  - Look at the list of missions you have assigned to the candidate FU.

  - Add up the total time the FU is expected to take to fire all the active missions you assigned it that are of a higher precedence & value than the target being analyzed. The response time is computed as the total time to fire each of these missions (considering the number of volleys to be fired & the sustained rate of fire for the candidate FU).

- When the FA CP receives an MFR on one of the missions it previously assigned a fire unit, then that fire unit's mission assignment history is updated to reflect the current active targets.

• Effects Capability. The unit is capable of achieving the specified effects (e.g. Destroy (30%), 40% etc.) on the target . This applies to effects missions only!   Effects algorithm used to determine volume of fire.   If the unit is not expected to achieve the desired effects then ID the unit as "Effects Incapable" for this munition.

• Max Volleys. The munition quantity for the MLRS unit (as determined from the observer request, FA AMT, Effects calculation, or mission characteristics) must be less than or equal to the Max volleys specified for your OPFAC in the "FA restrictions guidance". If the max volleys would be violated, then ID the unit - munition pairing as "Munitions incapable".

• Ammo on hand. The unit has enough ammunition (of the tested munition category) to fire the number of munitions in the option. If unit does not have enough of one of the models of the munition category (e.g. an MLRS platoon option requires 5 rounds of SADARM, the unit must have at least 20 rounds of a SADARM model - like M123), then ID the unit-munition pairing as "Munitions incapable".

• Range capability check 1. If the target location falls outside of the unit range fan (beyond or outside the right or left limits), then ID the unit-munition pairing as "Range incapable".

• Range capability check 2. AFATDS will determine the munition model (e.g. M26) to use for the tested munition category (e.g. DPICM). The max range of that munition model is determined based on the weapon platform (e.g. M270 MLRS) associated with the tested unit (assuming maximum propellant charge is used). If the range to target is greater than the weapon-munition model range capability then ID the unit-munition pairing as "Range incapable".

- Angle "T". Angle T is used as a capability check for copperhead missions only. Rocket/missile options are always capable for angle T.

- Mission Cutoff. If the value of the mission being analyzed is not greater than the Mission Cutoff value for "FA" then ID the unit-munition pairing as "Mission Cutoff incapable". This is done at FSEs only.

2. Unit Attack Analysis.

   When you run unit attack analysis, AFATDS looks for supporting or subordinate FA CPs and fire units. Fire units will be analyzed using detailed analysis while the CP(s) will be analyzed with unit level. For unit attack analysis, the following rules apply.

   - Only FA CPs are analyzed with unit attack analysis.

   - the CP will be determined capable if all of the following conditions exist.

     1). The CP's rollup data (range fans) has at least one range fan that covers the target.

     2). The CPs response time and current time is before the NLT/Operational Time for the target.

     3). The CP is not saturated with missions from your OPFAC (in other words, the total number of active missions on your active target list that have been sent to the CP is less than the saturation level in the CP's unit data).

     4). Mission cutoff value must be met or exceeded.

     5). CP must have specified munitions on hand (per the ammunition summary data in the CP Ammunition Rollup).

     6). Tested munition cannot be restricted in FS tasks matrix or FS munition restrictions.

     7). CP cannot be restricted in the FS tasks matrix.

NOTE!

The munitions that are tried for the unit attack analysis are determined in the same way as described for detailed attack analysis. Observer requested munitions are tried first, followed by FS tasks matrix, AMTs, and mission characteristics.

3. FS System Attack Analysis.

When you run system attack analysis, AFATDS uses the FS attack parameters guidance to determine the units to use. You do not need unit data on these units to run FS system analysis. AFATDS will simply determine the capability of each FS system based on the entries in the FA attack parameters guidance. A FS system is capable when the following conditions exist.

a. An unit ID is entered in the FS attack parameters for the given FS system.

b. The target is in the rangeable area specified for the FS system.

c. The FS system response time and current time is less than the NLT/Operational Time of the target.

d. The number of missions that you have sent to the Unit ID (extracted from the FS attack parameters) for a given FS system is less than the saturation level specified for that system in the attack parameters guidance.

e. Mission cutoff must be met or exceeded by this mission.

f. System and tested munition cannot be restricted in the FS tasks matrix or FS munitions restrictions.

NOTE!

The munitions that are tried for the unit attack analysis are determined in the same way as described for detailed attack analysis. Observer requested munitions are tried first, followed by FS tasks matrix, AMTs, and mission characteristics.

4. Special Notes.

- If the mission is an "Assign Priority Copperhead", only copperhead munitions will be tried. Any unit that cannot fire copperhead will be marked as Incapable.

- Target segmentation. AFATDS will segment (at the controlling unit of the mission) large area targets into sub-targets of "Standard target size":

  FA cannon - 200 x 200
  Mortar - 200 x 200
  Naval Gun - 200 x 200
  FA rocket - 800 x 800
  Air - No Segmentation
  ATACMS APAM - 2,000 x 2,000
  ATACMS BAT - 5,000 x 6,000 (strength of up to 70 per segment).
  EFOG-M - 4,000 x 1,000 (strength of up to 24 per segment)

- Target segmentation (linear targets). For linear targets AFATDS will determine segmentation requirements based on length. If the target is approximately 2,000 meters, AFATDS will segment the target. The longer the linear target - the more segments are required.

- Target segmentation (circular targets). For circular targets, AFATDS computes the area of the circle and determines if the target area is larger than the rectangular values listed above (like 200 x 200 for cannon). If the target area is about 1.25 times larger, then AFATDS will segment the circular target into 2 or more rectangular segments.

IMPORTANT!!

When AFATDS segments large area targets, new targets are not produced, so the original segment will look the same on the map and windows. When a target segment is sent to the BCS or FDS, the size and aimpoint for the segments are sent to each individual unit. See the Mission Processing for Missiles (ATACMS & EFOGM) section of this notebook for segmentation rules and procedures for ATACMS BAT munitions.

- Determination of volume of fire - Effects Missions. For effects targets - AFATDS will determine a Munition/Fuze to use based on the observer request, FA AMT or mission characteristics

  - What is an Effects Mission? AFATDS will determine a mission is an Effects Mission (i.e. requires effects calculations to determine volume of fire) when either of the following conditions are met:

    * Method of control is not "Continuos Fire".

    * Fire Request specifies an effects producing munition (like HE, DPICM, SADARM) but does not specify a quantity.

    * The Attack methods table (e.g. FA AMT) for the fire unit's FS system (e.g. FA) does not have a quantity of munitions to fire at the given target type.

    * Note: Effects (JMEM) data must be available for the given Target Type, otherwise the target will be handled as a volleys target.

  - Where are effects calculations done?   Effects calculations (using the super-quickie (SQ II) or SMART algorithms) are done at the controlling unit for the mission. Generally a "Controlling" unit is either the last AFATDS unit in the loop before the non-AFATDS FU device (i.e. BCS, FDS, Naval Ship, Air.), or the AFATDS unit managing a massed mission (e.g. FA CP). The list below provides some examples of controlling units:

    * The Bn FSE is the controlling unit for all missions assigned to the supporting mortar unit.

    * The Bde FSE is the controlling unit for all missions assigned to the supporting Naval Ship unit (providing the Naval Ship unit supports the Bde directly).

    * The AFATDS FA Platoon is the controlling unit for a non-massed missions (i.e. a mission in which that unit is the only one firing).

    * The FA CP is the controlling unit for missions it has assigned to two or more units.

- How is volume of fire determined? When AFATDS processes an effects mission, the generated option may or may not include a volume of fire. The level of attack analysis will determine whether or not a specific quantity is determined:

  * Unit and System Attack Analysis. When an effects target is analyzed using unit or system analysis, the following general rules apply:

    > No specific volume of fire is determined. A munition - fuze combination will be determined. The unit is assumed capable of achieving any effects level for all missions.

    > Naval Ship and Mortars will have volume of fire computed for the attack option at the FSEs that control them. These unit - munition pairings will then be evaluated for capability as described in paragraph D.1.

    > Air and aviation are always assumed to be effects capable.

    > AFATDS equipped Fire units directly supporting your OPFAC will not have a volume of fire calculated for single FU (un-massed) missions (remember, the AFATDS fire unit will be controlling the mission - so effects calculations will not be performed).

    > No Massing solutions will be generated.

  * Detailed Analysis at FSE, FA CP, FU. When an effects target is analyzed using Detailed analysis, the following general rules apply:

    > Large area targets will be segmented and massing on these targets is considered (except Air - AFATDS will not segment a target for Air or Aviation options). AFATDS will not mass on a single target with different FS systems (e.g. Naval Ship & FA fire units will not be considered for massing on the same target).

    > AFATDS will generally attempt to mass on personnel effects targets (massing on personnel targets results in better coverage of the target).

> Naval Ship and Mortars will have volume of fire computed for the attack option. These unit - munition pairings will then be evaluated for capability as described in paragraph D.1.

> Air and aviation are always assumed to be effects capable.

> AFATDS equipped Fire units directly supporting the FSE will have a volume of fire calculated.

- Determination of volume of fire - Volleys Missions. For volleys targets, AFATDS will determine a Munition/Fuze & quantity to use based on the observer request, FA AMT or mission characteristics. AFATDS will consider a target a "Volleys" target if one or more of the following conditions are met:

  - Observer specifies a specific munition & quantity in the Fire Request.

  - For FA options, if the FA AMT has a specific munition & quantity specified for the given target type & the FR did not specify an effects producing munition with unspecified quantity.

    * For Naval Ship options, if the Naval Gun AMT has a specific munition & quantity specified for the given target type & the FR did not specify an effects producing munition with unspecified quantity.

  - For Mortar options, if the Mortar AMT has a specific munition & quantity specified for the given target type & the FR did not specify an effects producing munition with unspecified quantity.

  - If the target is a "non-Effects" target type (i.e. there is no JMEM data available for the target type).

  - AFATDS will mass FA units on volleys targets if the target must be segmented (i.e. large area targets) or if the FA AMT specifies "Battery", "Battalion" etc. When AFATDS determines how to attack a volleys target, the following parameters are considered as indicated:

    * AFATDS will determine a number of tubes required to attack the target. The FA AMT can drive the number of

tubes based on the echelon specified in the AMT for the given target type:

Section - 1 tube
Platoon - 3 tubes
Battery - 6 tubes
Battalion - 18 tubes
Divarty - 54 tubes

* Massing on Volleys targets. As AFATDS develops the attack option, it will add fire units to the option (one by one) until the desired number of tubes is reached. For example, The FA AMT says "HE/PD 3 volleys - Battery" as the echelon to engage target type "POL Dump". AFATDS determines that 6 tubes are necessary. Two 3 gun fire units (i.e. two units with 3 weapons each on-hand - though not necessarily operational) would be determined capable (in terms of number of tubes) for this target.

NOTE!

When AFATDS generates a massing option requiring a specific number of tubes, it will accept an option with 2/3 of the desired total. In the example, 6 tubes were required but an option with 4 tubes would be considered acceptable. Also, if one of the Fire units contained 6 tubes, it would be considered to fire on this target without another fire unit (since this single unit has enough tubes to satisfy the need for 6 tubes).

* Mass All Systems may be specified if an AFATDS is the originator for a mission. The Mass All Systems option will include capable units within the specified FS system (cannon or MLRS) without regard to how many tubes are available.

* Massing Based on Echelon. When the attack guidance or operator specifies an echelon to attack the target, AFATDS will first try to get enough tubes in the attack option (as discussed above). However, if AFATDS cannot get the minimum # of tubes, AFATDS will look at the number of fire units in the attack option. If the number of fire units in the option is at least 2/3 of the given echelon, then that option will be marked capable (but the volley quantity will be increased to account for the fact that you are using fewer

units). For example, if a “Battalion” was requested for the mission and the attack option only contains 8 tubes (8 is not at least 2/3 of 18) that option could still be capable as long as the number of fire units in that option is at least 2 batteries or 4 platoons. See below:

Echelon	Min # of "Battery" Echelon Fire Units	Min # of "Platoon" Echelon Fire Units	Min # of "Section" Echelon Fire Units
Section	N/A	N/A	1
Platoon	N/A	1	2
Battery	1	2	4
Battalion	2	4	12
DivArty	6	12	36
All Available	1	1	1

If the target is a large area target, it will be segmented into 200 x 200 meter subtargets (as long as enough FUs are available to assign 1 FU per subtarget) for cannon & mortar analysis. Otherwise the target will be segmented based on # of available FUs (when this happens, the segments will be larger and the # of volleys per segment will be increased to account for the larger segment).

8. Attack Option Ranking.

The attack option ranking criteria has nothing to do with what options get generated by attack analysis. If you place "Mission characteristics" as the highest ranking criteria this will not cause Mission Characteristics to be used to generate options. Remember, AFATDS will try to use the observer specified munition on the target first (see paragraph 3). If a capable option was generated for all FUs being analyzed with the observer munition, then a mission characteristics solution will not be determined (recall that, AFATDS will make a 2nd pass through the units only if a capable unit was not found on the first pass).

Once several capable options have been generated, AFATDS will apply the attack option ranking criteria (in the order specified by the operator)B to determine which one to recommend. In general, they are applied as follows:

- Observer/Operator Specified: Capable Options that were developed from observer requested or operator specified (via guidance) parameters will receive preference over options that were not developed from observer requested or operator specified parameters. This includes observer specified munitions & fire units or the Attack Methods tables.

- FS tasks: capable options that were developed based on a FS tasks rule will receive preference.

- Mission Characteristics: Capable Options that were developed from Mission Characteristics table will receive preference over options that were not developed from Mission Characteristics.

- Unit Load: Capable Units that were least recently assigned will receive preference.

- FS Preference Table (used at FSE only): Capable Options that have a higher ranked FS system (for the target type in the mission) will receive preference over options that do not . For example, if the FS preference table had " Naval Ship " ranked "1" for bunker target type, any attack option using an Naval Ship fire unit on a Bunker target would receive preference over an option that did not use Naval Ship.

- FA Preference Table (used at FA CP only): Capable Options with fire units that are ranked in the FA Preference table will receive preference over options that do not .

- Shortest Range Munition. Prefers option using shorter range munitions (e.g. option with HE M107 would be preferred over HE-RAP option, ATACMS-BAT Block 1 would be preferred over option using ATACMS-BAT Block 1a).

- Unit closest to the target (used at FA CP only): The fire unit with the smaller gun-target range will be preferred over units with larger ranges.

- Unit Mission (used at FA CP only): If the local unit echelon is a higher CP (i.e. Divarty, Corps Arty), capable attack options with "GS" units will be preferred over "GSR" which is preferred over "R" which is preferred over "DS". If the local unit echelon is a lower CP (i.e. FA Bn), capable attack options with "DS" units will be preferred over "R" which is preferred over "GSR" which is preferred over "GS".

E. <u>Operator Intervention Processing</u>.

AFATDS provides the optional capability to interrupt mission processing after attack options are ranked, if the mission meets currently established intervention criteria. This permits the operator to review target processing and attack option processing results and either accept the processing action specified in the recommendation or select an alternative action.

1. Attack option recommendations are of the following categories :
   - Send OTF or FO to one or more units as a capable attack option.
   - Coordinate mission with a capable attack option with one or more responsible units.
   - Deny the mission for failing target checks or lack of a capable attack option.

2. The intervention windows allow the operator to view target and mission related data and both capable and incapable attack options and approve or choose other processing actions.

3. An overview of operator intervention processing actions is illustrated at Figure F-6. This flow diagram reflects operator selections which are both directly selectable options within the intervention widow or are a combination of a type recommendation, operator modified data and directly selectable options.

   a. Flow diagram "Operator selects Deny" reflects actions that occur when:

      1). Operator selects OK when the recommendation is Deny.
      2). Operator selects the Deny option without regard to the recommended action.

   b. Flow diagram "Operator Selects Planned" reflects actions that occur when the operator changes the Mission Precedence from "I" or "A" to "P" (Planned) and selects OK without regard to the Recommendation.

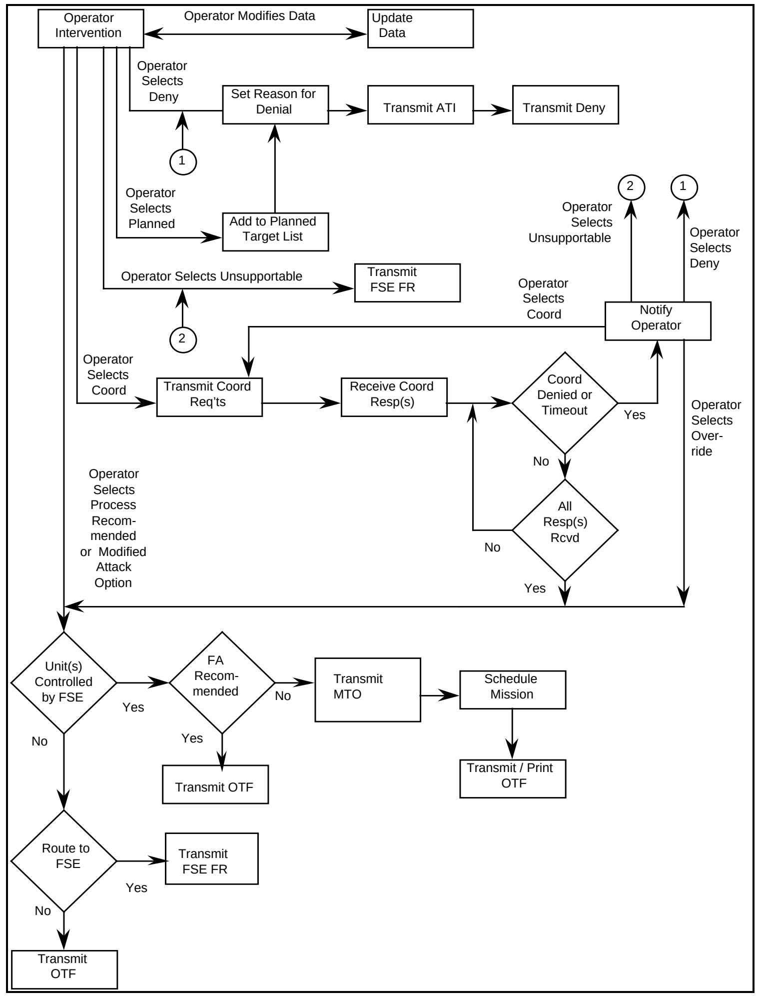


Figure F-6. Operator Intervention Processing

c. Flow diagram "Operator Selects Unsupportable" reflects actions that occur when the operator selects the "Unsupportable" option without regard to the Recommendation.

d. Flow diagram "Operator Selects Coord" reflects actions that can occur when the operator selects "OK" when the Recommendation is to coordinate the mission with one or more units.

e. Flow diagram "Operator Selects Process Recommended or Modified Attack Option" reflects actions that can occur when:

1). The operator selects "OK" when there is a recommended attack option.
2). The operator selects an alternate attack option and selects "Send" and the unit to which the mission will be sent.

4. It is important to remember that processing of all missions which meet intervention criteria are delayed at the OPFAC until the operator reviews and selects an action.

5. Multiple intervention criteria may be established based upon all or selectable combinations of values for the parameters listed below. These permit tailoring of intervention for only those missions which require review by or are of interest to fire support personnel while allowing the remainder to be processed without any unnecessary delays.

- Mission Precedence
- Mission Value
- Battle Area
- Mission Type
- Target Type
- Target Filter
- Analysis Result
- Recommended System / Caliber
- Munition Category

Appendix F: Counterfire

FM 6-121 (Field Artillery Target Acquisition) describes the fire support team (FSCOORD, Arty S2, Counterfire officer etc.) as having responsibility for the employment of radars. This includes determination of Sectors of Search and establishment of Firefinder zones. Properly instructed, the Firefinder can report targeting information that corresponds to the maneuver commander's guidance. First, a few details:

1. The radar is capable of tracking 9 firefinder zones. These zones may be any of the following:

    a. Critical Friendly Zone (CFZ). Purpose is to monitor specific friendly areas to engage enemy indirect fire units that are detected firing into these areas. When a radar detects fires that are predicted to land in a CFZ, the radar will submit a Call For Fire (with Immediate (urgent) precedence) on the firing location to the C2 element controlling the radar (usually AFATDS at the counterfire cell). The message use is the TACFIRE FM.CFF message. The mission is treated as "FFE-When Ready - EOM" with an "Immediate" precedence.

    b. Call for Fire Zone (CFFZ). Purpose is to monitor specific enemy areas to engage enemy indirect fire units that are detected firing from those areas. When a radar detects fires originating for anywhere in a CFFZ, it will submit a Call For Fire (with an as acquired (normal) precedence on the firing location to the C2 element controlling the radar (usually AFATDS at the counterfire cell). The message use is the TACFIRE FM.CFF message.

    c. Artillery Target Intelligence Zone (ATIZ). Purpose is to monitor specific enemy areas without requiring the targets detected firing from these areas to be engaged. When a radar detects fires originating for anywhere in a ATIZ, it will submit an ATI on the firing location to the C2 element controlling the radar (usually AFATDS at the counterfire cell). The message use is the TACFIRE ATI.CDR message. Note that the ATI.CDR may include the "Predicted Impact location" of the enemy rounds.

d. Censor Zone (CZ). Purpose is to protect friendly fire units that may be in the radar's search fan. The radar will not report detection of fires originating from these areas.

2. The radar is managed by the C2 element through the "Radar Deployment Order" (RDO). The RDO can tell the radar what his search area should be and what his Firefinder zones are. The counterfire officer is responsible for directing the radar via the RDO. New RDOs should be sent to the radar as the situation dictates.

3. Cueing instructions. The radar must also be told when to radiate to acquire targets. The RDO may also contain "Cueing Agents" (a list of units that are allowed to tell the radar when to radiate). Since there is not a "Begin Radiation" message that the firefinder accepts, this is best handled via the PTM initiate (as needed) by the designated agents and sent directly to the radar.

4. Counterfire COP was developed to assist the S2/Counterfire cell by providing graphical display of Counterfire targets. This process is accomplished by the adding of two check boxes on the map Overlay window. These boxes control the display of Friendly and Enemy vectors. AFATDS accomplishes the display of friendly vectors by tracking firing unit location(s) for each mission. The firing unit data is determined at the conclusion of attack analysis, as the fire unit recommended in the attack option. The firing unit data is then maintained with the mission data. At the end of attack analysis, the target location and firing unit location(s) will generate a blue vector, originating at the firing unit(s) and ending at the target location. The blue vector will inherit the characteristics of the target symbol for display purposes (same tgt.#, bold = active, etc.).

   Display of blue vectors is controlled by operator selection. This control is an extension of the map overlay window. If the operator selects to show targets on the map, an additional selection is provided to configure (on/off) display of blue vectors. The blue vectors when selected will be displayed independent of the fire units being displayed. If there are multiple firing units (massed missions), multiple blue vectors will be displayed. When a Mission Fired Report (MFR) is received for the mission, the firing unit location(s) for the mission will be updated if they differ from the location determined at the end of attack analysis, supplying a more accurate view of the actual firing unit location. If the firing unit location(s) has changed, the map graphic will be updated with the change(s).

Similar to Friendly vectors, Enemy vectors have a red display vector from the FS target to the Predicted Point of Impact (PPI), and this functionality is operator controllable through the map overlay window. Data to display enemy vectors is provided by counterfire radars in their ATI messages. The ATI message will contain a target location (where enemy is firing from) and a predicted impact location (where the radar thinks the enemy rounds will land). The red vector is drawn between these two points so the operator can visualize when the enemy counterfire activity is located.

AFATDS management information to the Commanders and FSCOORDS is furnished by the ability to route mission/target informational messages on targets received or initiated at the local OPFAC to selected AFATDS destinations. This routing is accomplished by the addition of an "Info Only" radio button in the Mission routing window. Up to 10 addressee can be identified for "Info Only" routing. This routing provides a means for the selected destination units to be aware of the current targeting and mission information being executed by a local OPFAC, by providing a Common Operational Picture. For example, a FA Battalion receives ATI inputs from Firefinder radar and ATI’s are processed by AFATDS (Suspect target, initiate a fire mission, etc.). The FA Battalion routes target information on these ATI’s to the Division Artillery CP so the counterfire cell at the Divarty can be aware of the missions and target data being processed by his subordinates. This capability requires that the operator at the local OPFAC specify which units should receive mission and target information. After AFATDS processes received target data (e.g. from an ATI or CFF) and determine the results of the target (e.g., add to planned target list), an “information copy” of that data (indicating the target outcome) will be provided to the specified AFATDS OPFACs. The OPFAC’s receiving “information copies” of active mission will add the target to the active target list, but will not analyze the target for attack (no mission processing will be performed). OPFACs that receive the routed target data will be able to see the targets on their maps.

IMPROTANT!!

If your OPFAC receives an Info copy of an active mission, the mission will be placed on your active target list. You cannot create MFRs, MTOs, etc. on Info copies. You can tell whether a given mission is an Info copy by viewing the target status. Info copies will have a status of "Establish Target" received.

As part of the AFATDS criteria for routing of information copies of target information, AFATDS considers targets that have gone through target processing (TSS, etc). Targets created at a local OPFAC, establish (planned) target or using New from the Oncall target list do not go through target processing and will not be forwarded as information copies.

In general, the following set-up parameters could be used at the counterfire OPFAC to manage counterfire:

- Create a "Counterfire" overlay for your map. Use it to display "Fire Support" targets, radar units, Fire finder zones, enemy fire support units, and MLRS fire units, include enemy and friendly vectors, if needed. This will allow you to focus on the situation graphics pertinent to your job. Turn other overlays on or off as necessary to de-clutter your display.

- Plan ahead. Coordinate with the G/S2 & G/S3 to determine where the firefinder zones should be. Of course the factors of METT-T apply. Enter the zones into the AFATDS geometry database.

- Where do you want the radar to be positioned to best acquire enemy fire units or cover your firefinder zones? Display the map background & your counterfire overlay. Postulate positions for the radar (by having its range fan displayed) by dragging his unit symbol on the map. Determine the best position and send <u>initial</u> RDO to the Radar. To do this, open the Radar Deployment Order window and select "Next Position" and enter (or paste from the map) the appropriate coordinates & search sector. Radar Zones can be added, old ones removed, or marked for deletion. Selecting "Send..." opens the Radar Instruction Send window and allows you to select one or more Radar Zones to transmit. Send this to the radar. The radar will receive an FM OBCO (telling him the new location) and a SPRT SEARCH (telling him the search sector information). Neither of these messages should be processed by the radar operator, but instead printed and given to the Radar Section Chief. He will use this information to Recon the location to determine actual position. Once the radar is in position, create and send another RDO and select "Current Location". Enter the Firefinder zones in the RDO and send. The radar will process the RDO (he will get a SPRT FILTER & SPRT SEARCH message which should be "processed"). The radar will now begin to report targets per your instructions.

NOTE!

The behavior of the RDO window may appear confusing. It is designed to accommodate the interface with the Firefinder Radar. Firefinder can handle a “current” and a “next” radar location, but it can store only one set of orientation data for the radar.

When first launched, the RDO window shows the “current” set of radar orientation data. When you select “next”, all fields appear grayed out except the “next location” field. The fields for radar orientation data are changed to show zeroes for values. If you enter a next location and “SEND”, a new “planned” location will be sent to Firefinder. When you return to the “current” view (after selecting SEND or OK on the “next” view), the current set of radar orientation data will be blanked out. THIS IS BY DESIGN. This is to prevent you from inadvertently resending the orientation data that applied to the old radar location.

- Place Radar target types: "Artillery Med SP", "Mortar Med", "Missile Light" on the HPT list and assign a "P" (planned) precedence. This will cause ATIs from the radar to automatically go on the planned target list (providing they pass TSS - i.e. are timely & accurately located). Remember, the radar will sort out whether to generate a CFF or ATI based on the target acquisition guidance you sent to him (Firefinder zones in the Radar Deployment Order).

- Use the planned target list to manage planned engagement of fire support targets. These targets can be added to a counterfire fire plan or have individual missions initiated on them as the situation dictates. Set up your TMM with a "P" (planned) precedence for fire support targets. This will cause all ATIs on fire support targets that pass TSS to go to the planned target list. Target generation (if you turn it on) will take care of the targets that do not pass TSS.

- Put the radar unit in your Priority of Fires list on the mission prioritization form (this will give missions received from the radar a higher value).

- Situation monitoring. On the AFATDS target lists there is a "Sort -- by Originator" function. If you are the AFATDS OPFAC fielding targets from the radar (i.e. the Radar is the originator of these targets to your OPFAC), then you can sort the list by originator and the targets will be sorted based on the unit ID of the originating units (for example, all of CMR 97's targets would be grouped together). This sort function may be used on any of the targets lists. You may also sort by the target type. This will group all of the target types typically reported by the radar (e.g. Artillery, Medium) together. The Counterfire Cell at DIVARTY should request mission routing (information only copy) from AFATDS FA OPFACs for the maneuver zones in which the radar zones are displayed.

Appendix F: Stay Hot - Shoot Fast

A. <u>"Stay Hot - Shoot Fast" (SHSF).</u> SHSF provides a rapid-fire capability to hit mobile, fleeting enemy targets. The approach for accomplishing this task is to load and "pre-aim" weapon systems at aim points where the enemy is expected to be. The mission is fired whenever a sensor reports that a corresponding target has been detected near the location of the preplanned mission.

B. <u>Setting Up AFATDS for SHSF.</u> The operator establishes two tolerance zones in the SHSF guidance (e.g. "Tolerance Zone 1" = 200 meters and "Tolerance Zone 2" = 500 meters) that are used as the basis to determine if the location in a given sensor ATI report is "close enough" to a preplanned mission. Operator also establishes (for fire support targets like "artillery unknown") a "minimum distance" value (this is the minimum distance the enemy target is firing when detected (based on the target location reported in the ATI and the Impact location in the ATI). The operator also enables SHSF processing (via checkbox on the SHSF window). The operator then initiates "FFE-Warning Order" fire missions to assign fire units to the projected target locations (this enables the fire unit(s) to prepare to fire when directed by the unit that initiated the mission).

C. <u>Comparing ATIs to the Preplanned Missions.</u> When an ATI is reported and passes TSS and passes the minimum target - impact distance and is determined to be within Tolerance Zone 1, a fire command is sent to the fire unit that was assigned the matched warning order mission. If the ATI is outside of Tolerance Zone 1, but inside Tolerance Zone 2, the fire unit that was assigned the matched warning order mission is sent a "when ready" command with the adjusted aimpoint locations (based on ATI location) for that mission.

NOTE!

The warning order mission must be in a "Ready" status to be considered for automatic firing: The warning order mission will be fired at the location reported in the ATI only if that new location does not violate a previously uncoordinated FSCM. If the ATI is outside of Tolerance Zone 2 or fails the minimum distance check or if SHSF processing is not enabled (check box

on the SHSF form) or if there is no guidance specified in the SHSF guidance for the target type reported in the ATI, the ATI will not match a warning order mission and it will be processed as a normal ATI. Also: Target type in the ATI report must be similar to target typed in the warning order mission in order for the warning order mission to be automatically fired.

Additional information: This process is performed after the TSS check. Intelligence reports must pass TSS in order to be considered for comparison against the active mission file. If the received intelligence report is determined to match one of the active missions, the matched mission's method of control shall be changed to "When Ready" and the intelligence report discarded (this is because the intelligence report has been used to update an existing target in AFATDS and is no longer needed).

D. Definitions.

1. Enemy Artillery Firing Range (minimum distance). This is the minimum firing range (distance between the a target location and impact location) against which the received intelligence reports will be compared.

2. Tolerance Zone 1: This is the maximum distance that the sensor report's target location can be from a preplanned mission's location in order to issue a "Fire" command without updating the original mission's target location.

3. Tolerance Zone 2: This is the maximum distance that the sensor report's target location can be from a preplanned mission's location in order to issue a "Fire" command after updating the original mission's target location.

Appendix G: Hexadecimal to Decimal Conversion Table

The following pages contain the hexadecimal to decimal conversion needed to translate EPLRS needline LCNs to AFATDS . The first column contains the decimal number used in AFATDS, the second column contains the HEX number used in EPLRS. See section on "Communications: EPLRS" for more.

Dec	Hex
0	0
1	1
2	2
3	3
4	4
5	5
6	6
7	7
8	8
9	9
10	A
11	B
12	C
13	D
14	E
15	F
16	10
17	11
18	12
19	13
20	14
21	15
22	16
23	17
24	18
25	19
26	1A
27	1B
28	1C
29	1D
30	1E
31	1F
32	20
33	21
34	22
35	23
36	24
37	25
38	26
39	27
40	28
41	29
42	2A
43	2B
44	2C
45	2D
46	2E
47	2F
48	30
49	31
50	32
51	33
52	34
53	35
54	36
55	37
56	38
57	39
58	3A
59	3B
60	3C
61	3D
62	3E
63	3F
64	40
65	41
66	42
67	43
68	44
69	45
70	46
71	47
72	48
73	49
74	4A
75	4B
76	4C
77	4D
78	4E
79	4F
80	50
81	51
82	52
83	53
84	54
85	55
86	56
87	57
88	58
89	59
90	5A
91	5B
92	5C
93	5D
94	5E
95	5F
96	60
97	61
98	62
99	63
100	64
101	65
102	66
103	67
104	68
105	69
106	6A
107	6B
108	6C
109	6D
110	6E
111	6F
112	70
113	71
114	72
115	73
116	74
117	75
118	76
119	77
120	78
121	79
122	7A
123	7B
124	7C
125	7D
126	7E
127	7F
128	80
129	81
130	82
131	83
132	84
133	85
134	86
135	87
136	88
137	89
138	8A
139	8B
140	8C
141	8D
142	8E
143	8F
144	90
145	91
146	92
147	93
148	94
149	95
150	96
151	97
152	98
153	99
154	9A
155	9B
156	9C
157	9D
158	9E
159	9F
160	A0
161	A1
162	A2
163	A3
164	A4
165	A5
166	A6
167	A7
168	A8
169	A9
170	AA
171	AB
172	AC
173	AD
174	AE
175	AF
176	B0
177	B1
178	B2
179	B3
180	B4
181	B5
182	B6
183	B7
184	B8
185	B9
186	BA
187	BB
188	BC
189	BD
190	BE
191	BF
192	C0
193	C1
194	C2
195	C3
196	C4
197	C5
198	C6
199	C7
200	C8
201	C9
202	CA
203	CB
204	CC
205	CD
206	CE
207	CF
208	D0
209	D1
210	D2
211	D3
212	D4
213	D5
214	D6
215	D7
216	D8
217	D9
218	DA
219	DB
220	DC
221	DD
222	DE
223	DF
224	E0
225	E1
226	E2
227	E3
228	E4
229	E5
230	E6
231	E7
232	E8
233	E9
234	EA
235	EB
236	EC
237	ED
238	EE
239	EF
240	F0
241	F1
242	F2
243	F3
244	F4
245	F5
246	F6
247	F7
248	F8
249	F9
250	FA
251	FB
252	FC
253	FD
254	FE
255	FF

Appendix H: ABCS Messages

A. <u>Overview</u>.

This section addresses transmission and receipt of ABCS -related messages. (See Appendix A for a list of abbreviations and acronyms used in this notebook.) The following table lists all ABCS messages supported by AFATDS.

Table H-1. ABCS Message Supported by AFATDS

No.	Short Title	Message Title
A423	ORDER	Order
C120	MIJIFEEDER	Meaconing, Intrusion, Jamming, and Interference Feeder Report
C241	AFU.MFR	Ammunition Fire Unit - Mission Fired Report
C281	ATI.ATR	Artillery Target Intelligence-Artillery Target Report
C400	SITREP	Commander's Situation Report
C443	NBC3	NBC 3 Report
C447	NBC4	NBC 4 Report
C488	NBC1	NBC 1 Report
C501	NBC5	NBC 5 Report
C506	NBC6	NBC 6 Report
C507	CDM	Chemical Downwind Message
C521	WXFCST	Weather Forecast
C523	SVRWXWARN	Severe Weather Warning
D210	FM.CFF	Fire Mission - Call For Fire
D280	ATI.TIR	Artillery Target Intelligence-Target Information Request

Table H-1. ABCS Message Supported by AFATDS		
No.	**Short Title**	**Message Title**
D281	ATI.TCRIT	Artillery Target Intelligence-Target Criteria
E400	PLANORDCHG	Plan Order Change
E500	AIR STRIKE WARN	Air Strike Warning
G131	INTSUM	Intelligence Summary
G489	NBC2	NBC 2 Report
S201	GEOMETRY	Battlefield Geometry
S202	FP.ATL	Fire Planning - Artillery Target List
S302	FREETEXT	Free Text Message
S305	TIDAT	Target Intelligence Data
S308	ATI.IEWTC	Artillery Target Intelligence- IEW Target Coordination Message
S309	ENE INTER MSG	Enemy Interoperability Message
S503	MOVTABLST	Movement Table Listing
S507	RESOURCES	Resources
S508	SUPCONSTRAINT	Supply Constraints
S509	CTIL	Commanders Tracked Item List

1. Message Transmission**.**

   Messages are either generated automatically by AFATDS software, or manually by the operator with an assist from AFATDS software.

   a. Automatically Generated Messages.
      AFATDS automatically generates messages whenever a particular event occurs. Events can be initiated manually by the operator or automatically by data distribution criteria or mission information routing. An example of an operator initiated event is the manual selection of a geometry and the transmission to a particular unit. Examples of System events are the forwarding of a Mission Fired Report to the node/OPFAC that initiated the fire request and the

transmission of an ATI.ATR whenever a fire mission is denied. The following is a list of automatically generated messages:

AFU.MFR (C241)	ATI.ATR (C281)	ATI.TCRIT (D281)
GEOMETRY (S201)	FP.ATL (S202)	ATI.IEWTC (S308)
MOVTABLST (S503)	RESOURCES - Unit Location (S507)	RESOURCES - Unit Resources (S507)

b. Computer Assisted Message Generation.
The operator may generate other messages by using a message template. The templates are available by selecting "**Messages | New...**". The following is a list of available ABCS message templates:

MIJIFEEDER (C120)	SITREP (C400)	NBC3 (C443)
NBC4 (C447)	NBC1 (C488)	NBC5 (C501)
NBC6 (C506)	ATI.TIR (D280)	PLANORDCHG (E400)
NBC2 (G489)	FREETEXT (S302)	

2. Message Reception.

Some ABCS-related messages received by AFATDS are automatically processed by the system upon receipt. Others are designated as "display-only" and are not processed by AFATDS.

a. Automatically Processed Messages on Receipt.
AFATDS automatically processes certain received messages. These incoming messages are also always printed on receipt. A message received with the correct format will have a status of "NON AFATDS RECEPTION SUCCESSFUL" printed on the message. An invalid or incorrect message will have a status of "NON AFATDS RECEPTION UNSUCCESSFUL" and will generate an operator alert. When this happens, the message contents will have to be manually entered or the originator must re-send the message with the proper format. The following is a list of automatically processed messages:

AFU.MFR (C241)	ATI.ATR (C281)	FM.CFF (D210)
GEOMETRY (S201)	TIDAT (S305)	ATI.IEWTC (S308)
ENE INTER MSG (S309)		

b. Display Only on Receipt.
Other messages received by AFATDS are designated as "display only". These messages are added to the counter on the Mailbox icon on the Status Bar. Messages can be viewed by selecting the Mailbox icon. The Message Main Menu window will open. Select In Box in the left column and the message to be viewed in the right column. Message text will be displayed on the bottom of the window. Once a message is reviewed, the operator can forward it, reply to it, archive it, print it, or delete it. The following is a list of messages that AFATDS displays to the operator:

ORDER (A423)	MIJIFEEDER (C120)	SITREP (C400)
NBC3 (C443)	NBC5 (C501)	NBC6 (C506)
CDM (C507)	WXFCST(C521)	SVRWXWARN (C523)
ATI.TIR (D280)	PLANORDCHG (E400)	AIRSTRIKEWARN (E500)
INTSUM (G131)	NBC2 (G489)	FREETEXT (S302)
RESOURCES - Supply Points (S507)	SUPCONSTRAINT (S508)	CTIL (S509)

B. <u>Operational Description of the Messages.</u>

This Section provides a description and amplifying information on ABCS-related messages.

1. Transmitted Messages.

a. Automatically Generated Messages.

AFU.MFR (C241)	Provides IEW target information and target disposition (if observed) following an engagement of a target.

ATI.ATR (C281)	Provides IEW with artillery target information. AFATDS automatically generates this message for missions that are denied.
ATI.TCRIT (D281)	Allows FS to specify the targeting criteria to IEW.
GEOMETRY (S201)	Data distribution criteria and operator initiated transmissions will cause this message to be generated. Only current battlefield geometry can be sent. Provides MCS with Fire Support Coordination Measures (FSCMs) and boundary lines. Provides FAADC2I with Air Corridors.
FP.ATL (S202)	Exchanges artillery target and fire planning information to MCS.
ATI.IEWTC (S308)	Provides IEW the capability to review certain target types before they are engaged by Fire Support. If a specific target type/subtype is specified as requiring IEW routing in the Target Management Matrix (TMM), a coordination request is automatically generated at the FSE.
MOVTABLST (S503)	Requests or reports on a scheduled route for the movement of a unit.
RESOURCES (S507) (Unit Location Option)	Provides MCS with the location of any Fire Support (FS) unit. Units are referenced by Unit Identification Code (UIC) in this message.
RESOURCES (S507) (Unit Resources Option)	With this message AFATDS provides CSSCS (and eventually MCS) with Fire Unit resource status of the Class III, V and VII items stored in the AFATDS database. Units are referenced by UIC in this message.

b. Computer Assisted Message Generation.

MIJIFEEDER (C120)	Provides a formatted message template to help the operator prepare MIJI information.

SITREP (C400)	Provides a formatted message template to help the operator prepare a Situation Report to provide to the G3. The G3 in turn rolls all BFA reports into a Tactical Operations Center (TOC) report to provide to higher and adjacent headquarters.
NBC3 (C443)	Provides a formatted message template to help the operator prepare NBC warnings.
NBC4 (C447)	Provides a formatted message template to help the operator prepare a report on NBC monitoring and survey results.
NBC1 (C488)	Provides a formatted message template to help the operator prepare an observer's initial report giving basic data on a nuclear, biological, or chemical attack.
NBC5 (C501)	Provides a formatted message template to help the operator pass information on areas of actual nuclear, biological, or chemical contamination
NBC6 (C506)	Provides a formatted message template to help the operator pass detailed information on chemical or biological attacks.
ATI.TIR (D280)	This message is used as a one-time target query, a standing request for Artillery Target Information (SRI), or a cancel a SRI.
PLANORD-CHG (E400)	Provides a formatted message template to help the operator update or change existing Operations Plans and /or Orders.
NBC2 (G489)	Provides a formatted message template to help the operator disseminate evaluated data of a nuclear, biological, or chemical attack.
FREETEXT (S302)	Allows for the sending of plain text information to another BFA.

2. Received Messages.

a. Automatically Processed Messages.

AFU.MFR (C241)	This message is received from IEW to provide Battlefield Damage Assessment (BDA) on targets. On receipt of this message AFATDS automatically updates the disposition of the specified target in the target files.
ATI.ATR (C281)	This message is received from IEW and provides artillery target information. AFATDS performs mission processing upon reception of this message.
FM.CFF (D210)	Initiates a fire mission from another BFA.
GEOMETRY (S201)	This message is received from various sources. It adds, updates or deletes battlefield geometry within AFATDS.
TIDAT (S305)	This message is received from IEW and provides target data. AFATDS performs mission processing upon receipt of this message.
ATI.IEWTC (S308)	Response to a fire support target coordination request from ASAS.
ENE INTER MSG (S309)	This message is received from IEW and causes Enemy Unit Data to be added, modified or deleted from the Current situation.

b. Display Only.

ORDER (A423)	Provides the standard military five-paragraph field operation order and contains instructions and directives.
MIJIFEEDER (C120)	Provides a primary means of sharing MIJI incidents in a timely manner and provides for joint exchange of tactical MIJI information.
SITREP (C400)	MCS-consolidated situation report or an IEW-generated enemy location SITREP.
NBC3 (C443)	Used to pass immediate warning of predicted contamination and hazard areas following NBC attacks.

NBC5 (C501)	Used to pass information on areas of actual nuclear, biological, or chemical contamination.
NBC6 (C506)	Used to pass detailed information on chemical or biological attacks.
CDM (C507)	Used to disseminate data every six hours and contains a forecast of the meteorological data needed for the chemical hazard area prediction procedure for three consecutive two hour periods.
WXFCST (C521)	Weather forecast for the area of operations.
SVRWX-WARN (C523)	Warning of severe weather that affects the area of operations.
ATI.TIR (D280)	This message is used as a one-time target query, a standing request for Artillery Target Information (SRI), or a cancel a SRI.
PLANORD-CHG (E400)	Used to update or change existing Operations Plans and/or Orders.
AIRSTRIKE-WARN (E500)	The message is used to provide immediate early warning of expected enemy airstrikes.
INTSUM (G131)	The INTSUM is used to provide a brief summary of intelligence information covering a specific period of time, as specified by the commander. The INTSUM provides a summary of the enemy situation in forward and rear areas, enemy operations and capabilities, and weather and terrain characteristics. It reflects the intelligence staff officer's interpretations and conclusions as to enemy capabilities and probable courses of action.
NBC2 (G489)	Used to disseminate evaluated data or a nuclear, biological, or chemical attack.
FREETEXT (S302)	Any plain text information.
RESOURCES (S507)	Supply point locations.
SUPCONSTRAINT (S508)	Identifies the priority of issue of supplies to different units. Also reports on supply shortages that could significantly affect operations.

CTIL (S509)	Commander's Tracked Item List. Informs FS what information the commander is interested in maintaining a status on. AFATDS has a fixed list of items that it reports; specifically these items are equipment, ammunition and POL. The reported items can not be tailored to match the commander's desired list in Version 1 software.

C. Message Preparation.

This section provides information on initializing AFATDS, preparing messages, and receiving messages.

1. System Initialization

   AFATDS must be properly configured to communicate with ABCS component systems. All ABCS systems must be entered in the master unit list with their correct ACCS Alias. Each AFATDS OPFAC must verify that its own ACCS Alias and UIC are correct. All destination ABCS units must be added to the current situation to enable correct grid conversions, and mission routing requirements must be established. Finally, all communication parameters must be entered and enabled. A list of trouble shooting procedures is provided at Appendix B. The following paragraphs describe the details and procedures to establish communications with ABCS Systems.

   a. ACCS Alias
   The ACCS Alias is a 33-character field that specifies the Originator and Destination Units in the Upper Layer Protocol (ULP) header. ULP provides end-to-end communication services over LAN and Mobile Subscriber Equipment (MSE) Packet Net (MPN). All AFATDS units require an ACCS Alias to communicate properly with ABCS. To talk to other ABCS systems, AFATDS needs to know its own ACCS Alias as well as the ABCS destination addresses. AFATDS will reject all messages with an unknown ACCS Alias. The ACCS Alias is entered into AFATDS on the Master Unit List. To edit the Master Unit List, select "**System | Administration | Master Unit List**". An Example of the ACCS Alias is shown here:

	1CVD	US	MAIN	FSE	OPS	

Other ABCS systems might show this alias with spaces instead of fields. With the fields being 4, 9, 2, 5, 5, 5, and 3 characters respectively, the alias might look like this (where _ is a space):

_ _ _ _ 1CVD_ _ _ _ _ USMAIN_ FSE_ _ OPS_ _ _ _ _

Eventually, this ACCS Alias will be fixed for the entire Army and will come pre-loaded on the AFATDS database (however, even then other ABCS units may still have to be entered).

b. Unit Identification Code (UIC)

AFATDS uses the UIC (entered on the Master Unit List) to fill in a unit name for the RESOURCES message. Entering the appropriate UICs for a unit will ensure correct message posting at the receiving system.

c. Current Situation
To communicate properly with a non-AFATDS unit (that is, an ABCS unit), the unit must be entered into the Current Situation. This is because the datum for the unit must be known in order to communicate with it. If the unit is not added, no grid locations will be sent in any ABCS message and all automatically processed messages will fail. From Current Situation perform the following steps to add a unit:

1.	Select "**Units | New**".
2.	Highlight desired Unit to be added.
3.	Choose **Unit Type** to be “**Other**".
4.	Enter Unit Location.
5.	Create Unit Symbol.
6.	Press Next.
7.	Press "**OK**".
8.	Press "**OK**" , Unit is now added.
9.	Repeat process to add all desired units. (If entering many units of a similar type, enter one and copy its format for the rest. To copy, highlight desired unit and select "Options | Copy".)

d. Default ASAS Unit
AFATDS automatically generates messages for ASAS sending ASAS messages to the ASAS unit specified in Mission Info Routing. To set AFATDS to automatically route ATIs and or MFRs and coordination requests to a particular ASAS unit continue with the following steps in the Current Situation:

1.	Select "**Mission Processing | Mission Routing | Mission Info Routing**"
2.	Press "**Add ...**".
3.	Select "**ASAS**".
4.	Choose desired ASAS "**Destination Unit**".
5.	Press "**OK**".

e. Communications
AFATDS can communicate with ABCS systems over LAN, MPN LAN and radio. To establish communications with another ABCS device the operator must, in order:

- Create an ABCS network (LAN, MPN LAN, or MCS)
- Assign Destination Units to the ABCS network
- Assign the ABCS network to a communications channel
- Activate the ABCS network

Note: Before turning the UCU on, verify that the AFATDS terminal is either connected to the External (ABCS) LAN or is terminated.

2. Message Creation.

a. Automatically Generated Messages.

AFU.MFR (C241)	AFATDS automatically generates the MFR on receipt or the operator initiation of an end of mission on an active fire mission. AFATDS sends this message to ASAS only if Mission Info Routing is set (see paragraph C.1.d).

ATI.ATR (C281)	When a fire request is denied by the operator or the system, AFATDS automatically generates an ATI. This message is sent to ASAS only if Mission Info Routing is set (see paragraph C.1.d). Additionally, the operator can select “**Mission Processing | ATI**” from the current situation to send an ATI manually to ASAS (note that the activity DTG of ATI is not available on the form and is not sent in the message). The required information is similar to the data needed to Initiate a Fire Mission.
ATI.TCRIT (D281)	1. To create this message select “**Targets | Target Criteria Request | New ASAS or New JSTARS**”.
	2. The Artillery Target Intelligence - Target Criteria Message window will open.
	3. Select “**Options | Edit Header**” to choose the destination address. Press "**Add**", highlight desired unit, and press "**OK**" to add each destination unit. Press "**OK**" to close this window.
	4. The following three fields are mandatory:
	a. Option Indictor [Add, Modify, or Delete] - If creating a new message or are adding additional information in subsequent messages use ADD; use MODIFY to change an existing request; use DELETE to delete a current request.
	b. Request Number [1 - 9] - Only nine requests can be outstanding at any one time.
	c. Area of Interest Type - Choose only one of the following areas using the radio buttons at the top of form:
	i. Distance Forward of FLOT - Use this option to report an area of interest that is forward of the FLOT.
	ii. Zone of Responsibility - Up to 3 ZORs can be specified.

	iii. Search Location/Rectangular Area - Use this option to report a rectangular search area. You may do this in two ways: For a thrust line and a width, the first coordinate (1:) is the origin of the center line; the second coordinate (2:) is the end of the center line; the search zone width is entered. **or** Give two corners: the first coordinate (1:) is the lower left-hand corner; the second coordinate (2:) is the upper right-hand corner; do not enter the search zone width.
	iv. Circular Area - Enter center coordinates and radius length.
	5. The following fields are optional in this message. These sets of information are used to amplify the targeting criteria of the area specified in the mandatory fields above.
	a. Target Category - Select one of AFATDS 15 target categories.
	b. Target Type - Select the target subtype.
	c. Target Permanence - Enter the requested permanence of the target in hours.
	d. Effective From / To - Enter the duration associated with this request. No entry in this field implies no expiration date of request, the request must then be canceled using the Cancel option.
	e. Value Accuracy - Enter the request target location error in meters.
	f. Reliability - A letter corresponding to the requested reliability of the source. Entries are from A (completely reliable) to F (Cannot be Judged).
	g. Output Request Category - Specify AT (Artillery Target Report) or FM (Fire Mission) for requested report format. This entry should not be used because both the ATI.ATR and FM.CFF messages are processed as a fire request.

	h. Target Specification Limits.
	i. Strength From / To - Enter the min/max target strength [1 - 999].
	ii. Length From / To - Enter the min/max length of the target.
	iii. Size From / To - Enter the min/max width of the target.
	6. Press "**Send**".
	7. Enter the Title and press "**OK**" to save or press "**Cancel**".
ATI.IEWTC (S308)	1. Select the desired target types in the Target Management Matrix (TMM) and select IEW routing for each target type.
	2. The coordination message will generated and sent to ASAS if the following occur: a. The fire mission must "FAIL" IEW Routing filter in the target selection process. Target type must be one of the target types selected in step 1. b. AFATDS must recommend sending the mission to a fire unit. If AFATDS recommendation is to deny the mission the coordination message will not be sent.
	3. Once a fire mission is received at the intervention point. Press "**IP**" and view the target information. Verify that the target fails the IEW filter. Also select "**Options | View Coordination**" and verify that AFATDS selected the desired ASAS unit (see Paragraph C.1.d). Press "**OK**" to close the window.
	4. "**OK**" the mission and verify that the fire mission has moved from "**IP**" to coordination (two hands shaking). The message has been sent to ASAS.
	5. ASAS has to respond within the allotted time (the target's dwell time) with a response of HOLD, FIRE, or DELETE.

GEOMETRY (S201)	1. There are two methods available to the operator for editing geometry features. The first method is via the trackball. Select a geometry on the current situation by using the left trackball button. To edit, hold the right button and select "**Edit**". The Second method available is to select "**Geometries | Edit...**" on the current situation. Select the desired geometry type and geometry and press "**OK**".
	2. Press "**Send...**". A Destination Unit List will appear.
	3. Select the Destination Unit and press "**Send**".
RESOURCES (S507) - (Location Option)	The location message sends the current location of any unit in the AFATDS database. This message can be sent either by data distribution criteria or by manually selecting the information to be sent. To manually send the message, do the following: 1. Select "**Units | Edit**" from the current situation.
	2. Highlight the desired Friendly Unit and press "**OK**".
	3. Select "**Send Status...**".
	4. Choose "**Operator Selectable**" and select "**Basic Unit Information**". This will send the unit's location.
	5. Press "**Send...**". A Destination Unit List will appear.
	6. Select the Destination Unit(s) and press "**Send**".
RESOURCES (S507) - (Resources Option)	The resources option is used to send unit resource data for Fire Units. This message can be sent either by data distribution criteria or by manually selecting the unit to which it is to be sent. To manually send the message, do the following: 1. Select "**Units | Edit**" from the current situation.
	2. Highlight the desired Friendly Unit and press "**OK**". (Remember that resource information can only be generated for Fire Units.)
	3. Select "**Send Status...**".

	4. Choose “**Operator Selectable**” and select one or more of the following send options: a. **Detailed Ammunition Summary** - This will send the unit’s ammunition summary. (Note: Three alerts will be generated for the Critical Ammunition Level - this is a known problem and we are working on it. Ignore the alerts for now.) b. **Equipment** - This will send the unit’s equipment status including weapons. c. **POL** - This will send the unit’s POL status.
	5. Press “**Send...**”. A Destination Unit List will appear.
	6. Select the Destination Unit(s) and press “**Send**”.
MOVTABLST (S503)	1. Create a Move Table in an order state. (See operator's notebook for procedures.)
	2. Select "**Move | Move Requirements Table**".
	3. Highlight the desired unit's movement table and press "**Send**". Make sure the movement table's state is order.
	4. Override the all restrictions by selecting "**Options | Override**". A Destination Unit List will appear.
	5. Select the Destination Unit(s) and press “**Send**”.

b. Computer Assisted Message Generation.

1). Access the messages by selecting Messages/New. The Messaging Main Menu window will open.

2). If the message template you want is in the main window, select it. If it is not in the main window, click on the "More>>" button.

3). Select the message baseline for the message you want to create, USMTF_2000 or USMTF_1993.

4). In the bottom list, select the message template you want and click on the OK button.

5). The message template for the message you want opens. Fill out the message template.

6). To address the message, click on the Address button. The Select Addresses window will open. Select the list of addresses you want to use in the "Select Names from the" field. Select the unit(s) to receive the message and move them to the "To-->" or "Cc-->" portion of the window by clicking the appropriate button and OK out of window. Click on SEND.

3. Message Reception

a. System Requirements For Automatic Message Processing

AFU.MFR (C241)	1. Originating unit must be contained in the current situation. 2. Target number must be contained in one of the target lists.
ATI.ATR (C281)	1. Originating unit must be contained in the current situation. 2. Valid target type/subtype. Invalid type will default to ADA/HVY. 3. Location must be valid.
GEOMETRY (S201)	1. Originating unit must be contained in the current situation. 2. Geometry type and location must be valid. 3. Current geometry indicator is sent in the message in the following format: KPLANORD/-// 4. Planned geometry indicator is sent in the message in the following format: KPLANORD/PLNMNO:plan alias// (Must be the 1-6 character alias contained in the general information in the plan) 5. Only one geometry can be sent in one message.

FM.CFF (D210)	1. Originating unit must be contained in the current situation. 2. Target type/subtype must be valid . Invalid type will default to ADA/HVY. 3. Location must be valid.
ATI.IEWTC (S308)	Coordination of mission must be in the requested state.
TIDAT (S305)	1. Originating unit must be contained in the current situation. 2. Target type/subtype must be valid . Invalid type will default to ADA/HVY. 3. Only one target per message. 4. Only ABCA Target Identifiers are supported. First character must be “A” followed by a 6 character target number. If target number is invalid, AFATDS will assign a new target number. If target number is a duplicate, AFATDS will ignore this duplicate request. 5. Location must be valid.

Appendix I: Package 11 Messages

AFATDS uses Package 11 messages to communicate and transfer informational messages with Package 11 systems. The Package 11 messages were developed to consolidate the number and type of messages used to communicate and transfer information between fire support digital devices.

AFATDS recognizes two levels of Package 11 message processing, Class III and Class IV. Class III processing requires operator involvement in the monitoring, execution and viewing of the messages. The AFATDS system does not perform automated processing of Class III messages and relies on the Common Message Processor (CMP) tool for operational support. For Class III messages the CMP processes provide data entry, display and storage of Class III messages. Therefore once you access the message template you must manually enter the specific data required based upon the message chosen. None of the data entered in a Class III template is stored in any AFATDS database, the messages with data entered are only stored in the message template lists.

Class IV messages are sent or received at AFATDS and are automatically processed without operator action to the messages. Class IV messages do not require accessing the message template function. The operator just executes his normal duties using the standard AFATDS windows and interfaces, and the computer handles the processing, use and storing of the data.

An example of a class III message that would require use of the CMP templates is an NBC1 Report, K05.02 message. If an operator wanted to report the detection of a chemical agent he would open the K05.02 message through AFATDS Messages, fill in the appropriate fields then address and send the message. On the other hand if you wanted to initiate a CFF from an AFATDS OPFAC the operator would use the normal Initiate Fire Mission Window, enter the appropriate information, select OK and AFATDS would handle the processing and transmission to appropriate destinations.

CAUTION!!

If an operator uses the class III templates to initiate or send information that is normally handled in a class IV, automatically processed mode, (e.g. a CFF message) AFATDS will not store the data in the appropriate databases and in the case of a CFF would not even know the mission or target is being fired. Operators should only use the Class III templates to send or receive information that AFATDS only handles in a Class III manner.

When AFATDS receives a legal message from a Package 11 system and that message is not supported by AFATDS in a class IV manner, the received message will be displayed to the operator as a Class III template. There are also Class III message templates that exchange information that is not processed or used in AFATDS functions. In these cases you must create a Class III message to send this information or you receive it through the Class III templates. Below is a list of the Package 11 messages AFATDS supports. All messages can be sent as a Class III message. The messages with an asterisk after transmit or receive can be sent as Class III messages only. For the other messages, Class IV processing is used as the primary method of sending the message.

Table I-1 Package 11 Messages

	Message Number.	**Message Title**	**Transmit / Receive**
1.	K01.50	Free Text	Transmit / Receive*
2.	K02.01	Check Fire	Transmit / Receive
3.	K02.02	Registration Data	Transmit / Receive*
4.	K02.03	Meteorological Data	Transmit / Receive
5.	K02.04	Call For Fire	Transmit / Receive
6.	K02.05	Shell Bomb Mortar Report	Transmit* / Receive
7.	K02.06	Observer Notification	Transmit / Receive
8.	K02.07	Survey Control Point	Transmit / Receive
9.	K02.08	Schedule of fires	Transmit / Receive

Table I-1 Package 11 Messages			
	Message Number.	**Message Title**	**Transmit / Receive**
10.	K02.09	Target Data	Transmit / Receive
11.	K02.10	Fire Plan Mission/Fire Plan Cancellation	Transmit* / Receive*
12.	K02.11	Ammunition Inventory	Transmit / Receive
13.	K02.12	On-Call Fire Command	Transmit / Receive
14.	K02.13	Mission Clearance	Transmit* / Receive*
15.	K02.14	Message To Observer	Transmit / Receive
16.	K02.15	Coordination Measures	Transmit / Receive
17.	K02.16	End of Mission and Surveillance	Transmit / Receive
18.	K02.17	Fire Mission/CAS Mission Summary	Transmit* / Receive*
19.	K02.18	Fire Unit Capabilities	Transmit / Receive
20.	K02.19	Artillery Intelligence Query/Standing Request for Target Information	Transmit / Receive
21.	K02.20	Survey Control Point Information Request	Transmit / Receive
22.	K02.21	Request for Clearance to Fire	Transmit* / Receive*
23.	K02.22	Subsequent Adjust	Transmit / Receive
24.	K02.23	Fire Plan Execution Orders	Transmit* / Receive*
25.	K02.24	Mission Notification	Transmit* / Receive*
26.	K02.25	End of Mission Notification	Transmit* / Receive*
27.	K02.27	TAC Air Request	Transmit* / Receive
28.	K02.31	Mission Request Rejection	Transmit / Receive*

Table I-1 Package 11 Messages			
	Message Number.	**Message Title**	**Transmit / Receive**
29.	K02.32	TAC Air Request (TAR) Acceptance	Transmit / Receive*
30.	K02.33	Tactical Air Request Aircrew Briefing	Transmit* / Receive*
31.	K02.34	Aircraft On-Station	Transmit* / Receive*
32.	K02.35	Aircraft Depart Initial Point	Transmit* / Receive*
33.	K02.36	Aircraft Mission Update	Transmit* / Receive*
34.	K02.40	Rocket/Missile Launcher Orders	Transmit* / Receive*
35.	K02.41	Geographical Reference Data	Transmit / Receive*
36.	K02.42	Commander's Fire Unit Guidance	Transmit / Receive
37.	K02.43	Commander's Fire Mission Guidance	Transmit* / Receive*
38.	K02.44	Commander's Target Acquisition Guidance	Transmit / Receive*
39.	K02.45	Howitzer Command	Transmit / Receive*
40.	K02.46	Reply/Remarks	Transmit* / Receive*
41.	K02.47	Rocket/Missile Operational Status Update	Transmit / Receive
42.	K02.48	Fire Plan Assignment Data	Transmit* / Receive*
43.	K02.49	Rocket/Missile Munitions Effects Date	Transmit* / Receive
44.	K02.50	Observer Status	Transmit / Receive
45.	K02.51	Unit Situation Report	Transmit / Receive
46.	K02.52	Request for Report	Transmit* / Receive

Table I-1 Package 11 Messages			
	Message Number.	**Message Title**	**Transmit / Receive**
47.	K02.53	Target Element Data Entry	Transmit* / Receive*
48.	K02.54	Deployment Command	Transmit / Receive*
49.	K02.55	Mutual Support Data Exchange	Transmit / Receive*
50.	K02.56	Fire Unit Tactical Scheduling	Transmit* / Receive*
50.	K02.58	Airborne Fire Mission	Transmit* / Receive*
52.	K05.02	Nuclear, Biological, Chemical Report One (NBC1)	Transmit* / Receive*
53.	K05.03	Nuclear, Biological, Chemical Report Two (NBC2)	Transmit* / Receive*
54.	K05.04	Nuclear, Biological, Chemical Report Three (NBC3)	Transmit* / Receive*
55.	K05.05	Nuclear, Biological, Chemical Report Four (NBC4)	Transmit* / Receive*
56.	K05.06	Nuclear, Biological, Chemical Report Five (NBC5)	Transmit* / Receive*
57.	K05.07	Nuclear, Biological, Chemical Report Six (NBC6)	Transmit* / Receive*
58.	K05.08	Basic Wind Report (BWR)	Transmit* / Receive*
59.	K05.09	Chemical Downwind Report (CDR)	Transmit* / Receive*
60.	K05.10	Effective Downwind Report (EDR)	Transmit* / Receive*

Table I-1 Package 11 Messages			
	Message Number.	**Message Title**	**Transmit / Receive**
61.	K05.11	Strike Warning (STRIKEWARN)	Transmit* / Receive*
62	K05.15	Field Orders	Transmit / Receive
63.	K07.01	MediVac Request	Transmit* / Receive*

* The messages with an asterisk after transmit or receive use class III templates only in the cases described, Class IV processing is used otherwise.
Note: All Package 11 messages can be transmitted at the Class III level.

A. Procedures for Constructing a Class III Package 11 Message.

1. Access the messages by selecting Messages/New. The Messaging Main Menu window will open.

2. If the message template you want is in the main window, select it. If it is not in the main window, click on the "More>>" button.

3. Select "Pkg 11" in the message baseline field.

4. In the bottom list, select the message template you want and click on the OK button.

5. The message template for the message you want opens. Fill out the message template.

6. To address the message, click on the Address button. The Select Addresses window will open. Select the list of addresses you want to use in the "Select Names from the" field. Select the unit(s) to receive the message and move them to the "To-->" or "Cc-->" portion of the window by clicking the appropriate button and OK out of window. Click on SEND.

WARNING!!

AFATDS allows operators to select and send Package 11 messages containing one of three Operational Indicator codes (Operational", "Exercise", or "Simulation"). The default setting for the send submessage Operational Indicator code is Operational. To allow maximum flexibility for AFATDS to interface with other systems, AFATDS allows operators to

select and receive submessages containing one, two, or all three Operational Indicator codes (Operational, Exercise, or/and Simulation). The default setting for the receive Operational Indicator code is Operational.

To change the Operational Indicator codes, click the center trackball button on the display's background. The Secure Debug Functions list will appear. Select "Set Operational Indicators" from the list. Changes to the script for Set Operational Indicators are made by selecting the number of the item you want, entering it after "Selection?", and pressing Enter to execute your selection. You can select Display Current Values to see the current values at any time. When viewing Current Values, "True" means that the item is selected and "False" means that the item is not selected. Return to Main Menu takes you back to the main menu for Set Operational Indicators.

You must exit and restart AFATDS before any changes made to the Operational Indicators will become effective.

B. Routing Messages Through the Package 11 FIST.

AFATDS provides the capability to route an observer's mission related subsequent message (MTO, Shot, Splash, Rounds Complete) to a FIST equipped with a Package 11 FOS device. In the "normal" mission chai n, the FO (FED, DMD, PK11 FOS etc.) will send the Fire request to his FIST HQ. The FIST approves the mission and forwards to AFATDS. AFATDS will process the mission as usual. When AFATDS determines that an MTO or observer notification (e.g. "shot") must be sent back to the observer, the AFATDS at the OPFAC interfacing directly with the FIST will address the observer's message to that FIST. This allows the FIST to "stay in the loop" on missions being executed by his FOs. It is important to note that to ensure this all works properly, the observer must initially send his mission through the FIST. This is so the FIST can "recognize" the MTO and determine which of his FOs should be sent the message. In order to make this behavior happen, you must perform the following set up procedures:

1. At the OPFAC that interfaces with the FIST (like the Bn FSE), set up your communications route to the FIST as "primary-direct" over your observer net. Set up your communications route to that FIST's subordinate observers as "primary-indirect" through the FIST.

2. At all other OPFACs, set up your communications with the FIST as usual. For example:

   - At a Bde FSE the communications routes would be set up as

     FIST: Route is "primary-indirect" through the Bn FSE
     FO: Route is "primary-indirect" through the Bn FSE

   - At DS Bn CP the communications routes would be set up as

     FIST: Route is "primary-indirect" through the Bde FSE
     FO: Route is "primary-indirect" through the Bde FSE

   - At Fire Units the communications routes would be set up as

     FIST: Route is "primary-indirect" through the DS Bn CP
     FO: Route is "primary-indirect" through the DS Bn CP

If you do not desire to have a FIST in the mission loop, your may set up direct routes to the observer (by passing the FIST). If you want to do this, simply set up a "primary-direct" route to the observer over the observer net.

IMPORTANT!
Both the FIST and Observer needs to be in the communications tables at all OPFACs that may process missions from those units. Even the fire units should have the FOs in their communications tables. If AFATDS attempts to transmit an MTO or other mission message to an observer that is not in the communications table, the message will fail. When this happens select the "Send to Originator" button on the failed transmission alert. This will forward the message back up the mission chain.

Appendix J: ASCA/NATO Interface with France

The following paragraphs describe the criteria and specific differences involved with interfaces with the ATLAS system.

A. Initial Database Creation.

1. AFATDS must be in a classified mode to communicate with ASCA systems.

2. To receive unit data from other ASCA countries, units have to be built using the following mapping for weapon type:

ASCA SYSTEM	US
MLRS (M270)	M270

3. To receive munitions data from other ASCA countries, the US operator has to enter an authorized quantity for at least 1 munitions.

B. Set up Communications.

1. Since the AFATDS does not automatically send the MSV ENQ the US must be the NET control station.

C. Establish Voice Link.

1. Same as normal procedures.

D. Establish Digital Link.

1. Turn on Communication Channel

2. Select Destination Unit

3. Activate Primary (Note: If an alert is generated with the message having been NAK'd, then manual resync procedures have to be performed).

IMPORTANT!!

Should a failure to acknowledge occur when AFATDS relays a message to a NATO device, AFATDS does not automatically generate and send a SYS.RRM to the message originator, as called for by the ASCA interface. Nor does the relaying AFATDS generate a warning message for the operator, indicating the transmission failure. This may lead the sender to believe that the message was received when it was not. It is recommended that AFATDS not be used to relay between NATO devices.

E. Complete Database with Information Exchange.

1. Same as normal procedures.

F. Interface Operating Procedures.

1. Geometries

a. National Restrictions - When sending circular geometry to France, they will convert it to a square of two times the radius at an attitude of 0000.

b. Procedure Differences - The US will translate a NFL from a ASCA nation into a CFL. When sending a restrictive area to FR you must send it as an RFA and identify the restrictions. If you wish to establish an NFA you must restrict all munitions. The ATLAS system will accept an NFA but will not show any violation.

2. MET Support

National Restrictions - The US does not segment the MET message and can not send a MET to another country, if requesting a MET only ask for lines 00 to 16.

3. Fire Planning

a. National Restrictions

1). The US does not maintain TSI (Suspect/Confirmed/Mission Fired) data on targets generated at AFATDS.

2). When an unscheduled target is added to a fire units schedule, ensure that a Shell/Fuze and the number of volleys is specified.
3). The US does not support Target Instance in a Fire Plan.

b. Procedure Differences

Fire Plans with ASCA members are done in the planning mode and <u>must</u> have a Plan Alias name entered. Once it is scheduled the targets associated with the other nation will be sent.

4. Fire Missions

The required messages for fire mission processing are FM.CFF to initiate the mission, FM.FMC to send commands to fire if AMC, FM.MTO if no EOM is specified, FM.SUB to end the mission, and FM.FMC (MFR) to show execution complete EXECOM. All of these messages must be sent for the mission to be successfully completed across the interface.

NOTE!

If you receive an alert on a target that you do not have in the your database, send a SYS.RRM requesting clarification from the unit that sent the message.

a. National Restrictions

1). The BCS operator should not send the SHOT and SPLASH for any mission or a READY command for a TOT to a ASCA unit.
2). When working with other countries, the US block of target numbers can not contain all 0s (example AB0000).
3). When a Cease Load is received from other countries, the US will change this to a Check Fire and a Cancel Cease Load will be translated to a Cancel Check Fire.
4). If the target is defined as a circle, it will be converted into a square of two times the radius at an attitude of 0000mils at the ASCA interface.
5). France will not accept a SUBS on a MLRS mission.
6). Fire missions received across the interface from the originator of a FSCM will be considered cleared and the operator will override the coordination.
7). On a personnel Type Target France will process the Degree of Protection as follows:

PRAND to PRONE
PROVER to COVER
PRUG to DUGIN

b. Procedure Differences

1). AFU.AMS is transmitted by using the Detailed Ammunition Status. If sending FUS data for the first time to a ASCA member, you must send FUS General and Basic Unit information separate and prior to sending the AMS data.
2). The operator will not be notified when unit information has been received from an ASCA nation. Request that the sender lets you know when transmission is complete. By sending a SYS.RRM. Or Verify that the data in AFATDS is current by checking the DTG.

Appendix J: ASCA/NATO Interface with Germany

The following paragraphs describe the criteria and specific differences involved with interfaces with the ADLER system.

A. Initial Database Creation.

1. AFATDS must be in a classified mode to communicate with ASCA systems.

2. To receive Unit data from other ASCA countries, units have to be built using the following mapping for weapon type:

ASCA SYSTEM	US
TRF1 (155mm)	M198
AUF1 (155mm)	M109A2

3. To receive munitions data from other ASCA countries, the US operator has to enter an authorized quantity for at least 1 munitions.

B. Set up Communications.

1. When setting up the ASCA ALIAS with ADLER all fields have to have an entry. Use X for blanks.

2. Since the AFATDS does not automatically send the MSV ENQ the US must be the NET control station.

C. Establish Voice Link.

1. Same as normal procedures.

D. Establish Digital Link.

1. Turn on Communication Channel

2. Select Destination Unit

3. Activate Primary (Note: If an alert is generated with the message having been NAK'd, then manual resync procedures have to be performed).

IMPORTANT!!
Should a failure to acknowledge occur when AFATDS relays a message to a NATO device, AFATDS does not automatically generate and send a SYS.RRM to the message originator, as called for by the ASCA interface. Nor does the relaying AFATDS generate a warning message for the operator, indicating the transmission failure. This may lead the sender to believe that the message was received when it was not. It is recommended that AFATDS not be used to relay between NATO devices.

E. <u>Complete Database with Information Exchange.</u>

1. Same as normal procedures.

F. <u>Interface Operating Procedures.</u>

1. Geometries

a. National Restrictions

1). When sending circular geometry to Germany, they will convert it to a square of two times the radius at an attitude of 0000.

2). Germany will not accept Geometries in a Fire Plan /Planning situation from any nation.

3). If UTM Northing is 10000000 or greater then Germany will set the grid to 9999999.

b. Procedure Differences

The US will translate a NFL from a ASCA nation into a CFL. When sending a restrictive area to GE you must send it as an RFA and identify the restrictions. If you wish to establish an

NFA you must restrict all munitions. The ADLER system will accept an NFA but will not show any violation.

2. Met Support

a. National Restrictions

The US does not segment the MET message and can not send a MET to another country, if requesting a MET only ask for lines 00 to 16

3. Fire Planning

GE does not process NNFP.FP messages. This needs to be checked in the next experiment with ADLER because it could not be done during the demonstration.

a. National Restrictions

1). The US does not maintain TSI (Suspect/Confirmed/Mission Fired) data on targets generated at AFATDS
2). When sending a request for target information, Germany does not recognize confirm targets. You will receive information on all targets of the type specified.
3). If a target group is specified, Germany will ignore the group.
4). When an unscheduled target is added to a fire units schedule, ensure that a Shell/Fuze and the number of volleys is specified.
5). The US does not support Target Instance in a Fire Plan.

b. Procedure Differences

Fire Plans with ASCA members are done in the planning mode and must have a Plan Alias name entered. Once it is scheduled the targets associated with the other nation will be sent.

4. Fire Missions

The required messages for fire mission processing are FM.CFF to initiate the mission, FM.FMC to send commands to fire if AMC, FM.MTO if no EOM is specified, FM.SUB to end the mission, and FM.FMC (MFR) to show execution complete EXECOM. All of these messages must be sent for the mission to be successfully completed across the interface.

NOTE!

If you receive an alert on a target that you do not have in the your database, send a SYS.RRM requesting clarification from the unit that sent the message.

a. National Restrictions

1). The BCS operator should not send the SHOT and SPLASH for any mission or a READY command for a TOT to a ASCA unit.
2). When working with other countries, the US block of target numbers can not contain all 0s (example AB0000).
3). When a Cease Load is received from other countries, the US will change this to a Check Fire and a Cancel Cease Load will be translated to a Cancel Check Fire.
4). GE will send a second EOM on a target that they have Check Fired. Ignore the second EOM.
5). If the target is defined as a circle, it will be converted into a square of two times the radius at an attitude of 0000mils at the ASCA interface.
6). Fire missions received across the interface from the originator of a FSCM will be considered cleared and the operator will override the coordination.

5. Other

a. Procedure Differences

1). AFU.AMS is transmitted by using the Detailed Ammunition Status, if sending FUS data for the first time to a ASCA member, you must send FUS General and Basic Unit information separate and prior to sending the AMS data.
2). If AFU.FUS is sent to Germany with a status of OUT, they will delete any ammunition data for that fire unit, the US operator must retransmit AMS for the unit once it is again operational.
3). The operator will not be notified when unit information has been received from an ASCA nation. Request that the sender lets you know when transmission is complete. By sending a SYS.RRM. Or Verify that the data in AFATDS is current by checking the DTG.

Appendix J: ASCA/NATO Interface with United Kingdom

The following paragraphs describe the criteria and specific differences involved with interfaces with the BATES system.

A. Initial Database Creation.

1. AFATDS must be in a classified mode to communicate with ASCA systems.

2. To receive Unit data from other ASCA countries, units have to be built using the following mapping for weapon type:

ASCA SYSTEM	US
M109A3G (155mm)	M109A3
PH2000 (155mm)	M109A6
L118 (105mm)	M119
FH70 (155mm)	M198

3. To receive munitions data from other ASCA countries, the US operator has to enter an authorized quantity for at least 1 munitions.

B. Set up Communications.

1. Since the AFATDS does not automatically send the MSV ENQ the US must be the NET control station.

C. Establish Voice Link.

1. Same as normal procedures.

D. Establish Digital Link.

1. Turn on Communication Channel
2. Select Destination Unit.
3. Activate Primary (Note: If an alert is generated with the message having been NAK'd, then manual resync procedures have to be performed).

IMPORTANT!!

Should a failure to acknowledge occur when AFATDS relays a message to a NATO device, AFATDS does not automatically generate and send a SYS.RRM to the message originator, as called for by the ASCA interface. Nor does the relaying AFATDS generate a warning message for the operator, indicating the transmission failure. This may lead the sender to believe that the message was received when it was not. It is recommended that AFATDS not be used to relay between NATO devices.

E. Complete Database with Information Exchange.

1. Same as normal procedures.

F. Interface Operating Procedures.

1. Geometries

a. Procedure Differences

1). The US will translate a NFL from a ASCA nation into a CFL.

2). An NFA has to be sent as an RFA with All specified. When sending a restrictive area to UK you must send it as an RFA and identify the restrictions. If you wish to establish an NFA you must restrict all munitions. The BATES system will accept an NFA but will not show any violation.

2. Met Support

a. National Restrictions

The US does not segment the MET message and can not send a MET to another country, if requesting a MET only ask for lines 00 to 16.

b. Procedure Differences

3. Fire Planning

a. National Restrictions

1). The US does not maintain TSI (Suspect/Confirmed/Mission Fired) data on targets generated at AFATDS.
2). When an unscheduled target is added to a fire units schedule, ensure that a Shell/Fuze and the number of volleys is specified.
3). The US does not support Target Instance in a Fire Plan.
4). The UK will always send a COMFP before they send the Fire Plan, ignore this message.
5). When scheduling a UK unit to a plan insure that there is a 2 minute interval between targets for the same unit.

b. Procedure Differences

Fire Plans with ASCA members are done in the planning mode and <u>must</u> have a Plan Alias name entered. Once it is scheduled the targets associated with the other nation will be sent.

4. Fire Missions

The required messages for fire mission processing are FM.CFF to initiate the mission, FM.FMC to send commands to fire if AMC, FM.MTO if no EOM is specified, FM.SUB to end the mission, and FM.FMC (MFR)to show execution complete EXECOM. All of these messages must be sent for the mission to be successfully completed across the interface.

NOTE!

If you receive an alert on a target that you do not have in the your database, send a SYS.RRM requesting clarification from the unit that sent the message.

a. National Restrictions

1). The BCS operator should not send the SHOT and SPLASH for any mission or a READY command for a TOT to a ASCA unit.
2). When working with other countries, the US block of target numbers can not contain all zeroes (0).s (example AB0000).

3). When a Cease Load is received from other countries, the US will change this to a Check Fire and a Cancel Cease Load will be translated to a Cancel Check Fire.

4). Fire missions received across the interface from the originator of a FSCM will be considered cleared and the operator will override the coordination.

5. Other

a. Procedure Differences

1). AFU.AMS is transmitted by using the Detailed Ammunition Status, if sending FUS data for the first time to a ASCA member, you must send FUS General and Basic Unit information separate and prior to sending the AMS data.

2). The operator will not be notified when unit information has been received from an ASCA nation. Request that the sender lets you know when transmission is complete. By sending a SYS.RRM. Or Verify that the data in AFATDS is current by checking the DTG.

Appendix K: Munitions Characteristics

A. Legal Shell/Fuze Combinations.

The following table lists the legal shell (projectile) and fuze combinations available based on the specific weapon model platform. Additionally, the AFATDS projectile and fuze categories are associated with the projectile and fuze model numbers, respectively. This table is used by the system for determining valid shell/fuze combinations for specific attack criteria recommendations.

Table K-1. Shell/Fuze Matrix

105-MM: M101A1, M102, AND M119A1

AFATDS PROJECTILE CATEGORY	PROJECTILE MODEL	AFATDS FUZE CATEGORY	FUZE MODEL
HE	M1 DC (Deep Cavity)	PD	M557, M572, M739, M739A1, Mk399 Mod 1
(High Explosive)	M1 NC (Normal Cavity)	(Delay)	M557, M572, M739, M739A1, Mk399 Mod 1
		CP	M78, M78A1, M78A1Q
		TIME	M564, M582, M582A1, M767
		VT	(M513, M513A1, M513A2, M513B1)*, M728*, M732, M732A2
	M760 DC****	PD	M739, M739A1, MK 399 Mod 1
	M760 NC ****	(Delay)	M739, M739A1, MK 399 Mod 1

AFATDS PROJECTILE CATEGORY	**PROJECTILE MODEL**	**AFATDS FUZE CATEGORY**	**FUZE MODEL**
		TIME	M582, M582A1, M767
		VT**	M728* , M732, M732A2
APICM (Anti-Personnel-ICM)	M444	TIME	M548, M565
WP (Smoke, White Phos)	M60WP M60A1WP	PD	M557, M572, M739, M739A1
	M60A2WP	PD	M557, M572, M739, M739A1
		TIME	M564, M582, M582A1, M767
Smoke (Base Ejection)	M84A1HC	TIME	M577, M577A1, M548, M565, M762
ILLUM (Illumination)	M314A3	TIME	M577, M577A1, M548, M565, M762
HE RAP	M548	PD	M557, M572, M739, M739A1, MK 399 Mod 1
(Rocket Assisted		(Delay)	M557, M572, M739, M739A1, MK 399 Mod 1
Projectile)*****		TIME	M582, M582A1, M767
		VT***	M728
	M913****	PD	M739, M739A1
		TIME	M582, M582A1, M767
		VT	M732A2
DPICM	M915******, M916	TIME	M557, M577A1, M762

* Compatible with DC Projectile only, charges 1 thru 6. Charge 7 can be fired under combat emergency conditions only. M513 series are fired with charges 1 thru 6. Charge 7 can be fired under combat emergency conditions only.

** M728* , M732 and M732A2 can be fired under combat emergency conditions only with these projectiles.

***	M728 fuze is authorized under combat emergency conditions only.
****	Legal for M119A1 Howitzer only. Projectile can be fired between 300-800 Mils without restriction, elevations above 800 Mils can be fired under combat emergency conditions only.
*****	Propelling charge 7 can only be used when rocket in on.
******	Legal for M119A1 Howitzer only

155-MM: M114A2, M109A2/A3/A5/A6, M198

AFATDS PROJECTILE CATEGORY	PROJECTILE MODEL	AFATDS FUZE CATEGORY	FUZE MODEL
HE	M107 DC***	PD	M557, M572, M739, M739A1, MK 399 Mod 1
	M107 NC***	(Delay)	M557, M572, M739, M739A1, MK 399 Mod 1
		CP	M78, M78A1, M78A1Q
		TIME	M564, M582, M582A1, M767
		VT*	M732, M732A2, M514, M514A1, M514A3, M514B1, M728
	M795*******	PD	M557, M572, M739, M739A1
		(Delay)	M557, M572, M739, M739A1
		TIME	M564, M582, M582A1, M767
		VT	M732, M732A2
APICM	M449A1	TIME	M577, M577A1, M548, M565, M762
WP***	M110WP	PD	M557, M572, M739, M739A1
	M110A1WP M110A2WP	(Delay)	M557, M572, M739, M739A1
		TIME	M564, M582, M582A1, M767
Smoke***	M116A1HC	TIME	M577, M577A1, M548, M565, M762
WP2 (Smoke, Base Ejection, WP)	M825 M825A1*******	TIME	M577, M577A1, M762

AFATDS PROJECTILE CATEGORY	**PROJECTILE MODEL**	**AFATDS FUZE CATEGORY**	**FUZE MODEL**
ILLUM	M485A1/A2	TIME	M577, M577A1, M548, M565, M762
DPICM	M483A1 M864*******	TIME	M577, M577A1, M762
ADAM (Area Denial Artillery Munition)	M692 (Long Delay)*** M731 (Short Delay)***	TIME	M577, M577A1, M762
RAAM (Remote Anti Armor Mine)**	M718/A1 (Long Delay)*** M741/A1 (Short Delay)***	TIME	M577, M577A1, M762
HE RAP	M549****	PD	M557, M572, M739, M739A1, MK 399 Mod 1
(HE Rocket Assisted Projectile)	M549A1	(Delay)	M557, M572, M739, M739A1, MK 399 Mod 1
		TIME	M582, M582A1, M767
		VT	M732A2
SADARM	M898	TIME	M577, M577A1, M762
Copperhead*****	M712	N/A	N/A

* Fuzes M728 and the M514 Series are compatible with the Deep Cavity (DC) projectile only.
*** Propelling charge 1 is restricted to emergency use only and is not legal for the M198 Howitzers.
**** Projectile M549 cannot be fired with M203/M203A1 propellant.
***** Propelling charge 4 is restricted to low angle fire only with Copperhead.
****** Fuze models M78 and M78A1 only legal for M114A1 Howitzers only.
******* Projectile Model only legal for M109 series and M198 Howitzers only.

203-MM (8 inch): M110A2

AFATDS PROJECTILE CATEGORY	**PROJECTILE MODEL**	**AFATDS FUZE CATEGORY**	**FUZE MODEL**
HE	M106 DC	PD	M557, M572, M739, M739A1

AFATDS PROJECTILE CATEGORY	PROJECTILE MODEL	AFATDS FUZE CATEGORY	FUZE MODEL
	M106 NC	(Delay)	M557, M572, M739, M739A1
		CP	MK399 mod1
		TIME	M564, M582, M582A1, M767
		VT*	M728, M732, M732A2
APICM (Anti-Personnel-ICM)	M404 M684	TIME	M577, M577A1, M565, M762
DP ICM	M509A1	TIME	M577, M577A1, M762
HE RAP	M650	PD	M577, M572, M739, M739A1
	[Rkt off]	(Delay)	M577, M572, M739, M739A1
		TIME	M564, M582, M582A1, M767
		VT	M732, M732A2
		CP	MK399 Mod1
	M650	PD	M577, M572, M739, M739A1
	[Rkt on]	(Delay)	M577, M572, M739, M739A1
		TIME	M767
		VT	M732A2
		CP	MK399 Mod1

* VT fuzes listed are compatible with M106 Deep Cavity (DC) projectile only.

81-MM MORTAR: M29A1

AFATDS PROJECTILE CATEGORY	PROJECTILE MODEL	AFATDS FUZE CATEGORY	FUZE MODEL
HE	M374, M374A2, M374A3	PD	M524, M526, M567, M716
		VT	M532
	M362A1	PD	M526, M524A5
		VT	M532
WP	M375, M375A2	PD	M524, M526, M567, M716

AFATDS PROJECTILE CATEGORY	PROJECTILE MODEL	AFATDS FUZE CATEGORY	FUZE MODEL
		VT	M532
	M375A3	PD	M567, M524A6
	M370	PD	M524A4, M526
ILLUM	M301A1, M301A2	TIME	M84
	M301A3	TIME	M84A1

81-MM MORTAR: M252

AFATDS PROJECTILE CATEGORY	PROJECTILE MODEL	AFATDS FUZE CATEGORY	FUZE MODEL
HE (High Explosive)	M889/A1	PD	M935
	M821	TIME	M734
Smoke, RP (Smoke, Red Phos)	M819	TIME	M772
ILLUM	M853A1	TIME	M768
Training, Long Range	M879	PD	M761
Training, Short Range	M880	TIME	M775

107-MM MORTAR: M30 (4.2 in)

AFATDS PROJECTILE CATEGORY	PROJECTILE MODEL	AFATDS FUZE CATEGORY	FUZE MODEL
HE (High Explosive)	M329A1/A2	PD	M557, M739
		TIME	M564, M520
		VT	M513, M732, M728
WP	M328 M328A1	PD	M48A3, M521
ILLUM	M335A2	TIME	M565
CS (Chlorine: Riot Control)	M630	TIME	M548

120-MM MORTAR: M285

AFATDS PROJECTILE CATEGORY	PROJECTILE MODEL	AFATDS FUZE CATEGORY	FUZE MODEL
HE	M933	PD	M745
	M934	TIME	M734
WP	M929	PD	M745
ILLUM	M930	TIME	M776

5-In/38 Cal NAVAL GUN *

AFATDS PROJECTILE CATEGORY	PROJECTILE MODEL	AFATDS FUZE CATEGORY	FUZE MODEL
HE	Mk35, Mk47, Mk49, Mk51, Mk52, Mk66	PD	Mk29
	Mk35, Mk47, Mk49	TIME	Mk50
	Mk51, Mk66		Mk349
	Mk99		Mk403
	Mk35, Mk47, Mk49, Mk51	VT	Mk71
	Mk35, Mk47, Mk49, Mk51, Mk56, Mk66	CVT (VT)	Mk360
HC	Mk35, Mk49, Mk52,	PD	Mk29
	MK52	DELAY	Mk52
HE RAP	Mk57	VT	Mk357, Mk358, Mk359
	Mk57	CVT (VT)	Mk360
ILLUM	Mk30, Mk44, Mk50	TIME	Mk50
	Mk30, Mk44, Mk50		Mk61, Mk349
	Mk50		Mk403
WP	Mk30, Mk44, Mk50,	PD	Mk29, Mk66
	Mk30, Mk44, Mk50	TIME	Mk50
	Mk50		Mk61, Mk403
	Mk30, Mk44, Mk50		Mk349

* TACFIRE employs shell code "NAV" for all naval guns

5-In/54 Cal NAVAL GUN *

AFATDS PROJECTILE CATEGORY	**PROJECTILE MODEL**	**AFATDS FUZE CATEGORY**	**FUZE MODEL**
HE	Mk41, Mk61, Mk64,	PD	Mk30
	Mk64		Mk407, Mk407 Mod 1
	Mk64	TIME	Mk393
	Mk41, Mk64	VT	Mk73
	Mk64		Mk418
	Mk41, Mk55, Mk64, Mk65	CVT (VT)	Mk360, M732
HE RAP	MK58	CVT (VT)	Mk360
ILLUM	Mk48	TIME	Mk25, Mk342
WP	Mk48	PD	Mk30
	Mk48	TIME	Mk25, Mk342

16-In/50 Cal NAV GUN *

AFATDS PROJECTILE CATEGORY	**PROJECTILE MODEL**	**AFATDS FUZE CATEGORY**	**FUZE MODEL**
HE/HC	Mk13	PD	Mk29, Mk48
	Mk14		Mk48
	Mk14	DELAY	Mk21
	Mk13	TIME	Mk724
	Mk13	CVT (VT)	M732
AP	Mk8	DELAY	Mk21
APICM	Mk19	TIME	Mk724

* TACFIRE employs shell code "NAV" for all naval guns

Air Munitions
Rockets
Cannons
Fire Bombs
Napalm
FASCAM Bombs
Crater Bombs
GP Bombs
Guided Missiles
Guided Bombs

Air Munitions

Cluster Bombs: Antipersonnel
Cluster Bombs: Anti-armor

Aviation Munitions

Rockets
Cannons
Guided Missiles

B. Projectile Characteristics

The following table lists the AFATDS Projectile Category, TACFIRE Type, DODAC, Minimum Range* and Maximum Range based on Projectile Model by weapon system.

Table K-2. Projectile Characteristics

105-MM M101A1

Projectile Category	Projectile Model	TACFIRE TYPE	Propellant Model	Min Range - Meters	Max Range - Meters
HE	M1 DC	HEA	M67	600	10900
	M1 NC	HEB	M67	600	10900
WP	M60WP	SMA	M67	600	10900
	M60A1WP	SMA	M67	600	10900
	M60A2WP	SMA	M67	600	10900
SMOKE	M84A1 /HC	SMB	M67	600	10900
ILLUM	M314A3	ILA	M67	800	8700
APICM	M444	HEC	M67	1800	10100
HE RAP	M548	HER	M176	600	14000
DPICM	M916	HEF	M67	1800	10100

105-MM M102

Projectile Category	Projectile Model	TACFIRE TYPE	Propellant Model	Min Range - Meters	Max Range - Meters
HE	M1 NC	HEB	M67	600	11400
WP	M60WP	SMA	M67	600	11400
	M60A1WP	SMA	M67	600	11400
	M60A2WP	SMA	M67	600	11400
SMOKE	M84A1 /HC	SMB	M67	600	11400
ILLUM	M314A3	ILA	M67	800	9100

Projectile Category	Projectile Model	TACFIRE TYPE	Propellant Model	Min Range - Meters	Max Range - Meters
APICM	M444	HEC	M67	1800	11300
HE RAP	M548	HER	M176	600	15000
DPICM	M916	HEF	M67	1800	11300

105-MM M119A1

Projectile Category	Projectile Model	TACFIRE TYPE	Propellant Model	Min Range - Meters	Max Range - Meters
HE	M1 NN	HEB	M67	600	11400
WP	M60WP	SMA	M67	600	11400
	M60A1WP	SMA	M67	600	11400
	M60A2WP	SMA	M67	600	11400
SMOKE	M84A1 /HC	SMB	M67	600	11400
ILLUM	M314A3	ILA	M67	800	9600
APICM	M444	HEC	M67	600	11300
HE RAP	M548	HER	M176	600	15000
HE	M760 DC	HEG	M200	600	14000
	M760 NC	HEH	M200	600	14000
HE RAP	M913	HRR	M229	600	20000
DPICM	M915	HEF	M200	1800	14200
	M916	HEF	M67	1800	10800

155-MM M114A2

Projectile Category	Projectile Model	TACFIRE TYPE	Propellant Model	Min Range - Meters	Max Range - Meters
HE	M107 NC	HEB	NS	800	14700
WP	M110WP	SMA	NS	800	14700
	M110A1WP	SMA	NS	800	14700
	M110A2WP	SMA	NS	800	14700
Smoke	M116A1HC	SMB	NS	800	14700
APICM	M449A1	HEC	NS	2000	14600
DPICM	M483A1	HEF	NS	1900	14300
ILLUM	M485A1	ILA	NS	2500	14200
	M485A2	ILA	NS	2500	14200
HE RAP	M549	HER	NS	800	19500
	M549A1	HER	NS	800	19500
ADAM-Long	M692	APL	NS	2800	14200

Projectile Category	Projectile Model	TACFIRE TYPE	Propellant Model	Min Range - Meters	Max Range - Meters
Copper-head	M712	CPH	NS	3000	13000
RAAM-Long	M718	AML	NS	2000	14300
	M718A1	AML	NS	2000	14300
ADAM-Short	M731	APS	NS	2800	14200
RAAM-Short	M741	AMS	NS	2000	14300
	M741A1	AMS	NS	2000	14300
WP2	M825	SMC	NS	1500	14400
SADARM	M898	SAD	NS	2100	14300

155-MM M109A2/A3

Projectile Category	Projectile Model	TACFIRE TYPE	Propellant Model	Min Range - Meters	Max Range - Meters
HE	M107 DC	HEA	M3A1	800	9800
			M4A2	800	14700
			M119A1	800	18100
			M119A2	800	18100
	M107 NC	HEB	M3A1	800	9800
			M4A2	800	14700
			M119A1	800	18100
			M119A2	800	18100
WP	M110WP	SMA	M3A1	800	9800
			M4A2	800	14700
			M119A1	800	18100
			M119A2	800	18100
	M110A1WP	SMA	M3A1	800	9800
			M4A2	800	14700
			M119A1	800	18100
			M119A2	800	18100
	M110A2WP	SMA	M3A1	800	9800
			M4A2	800	14700
			M119A1	800	18100
			M119A2	800	18100
SMOKE	M116A1HC	SMB	M3A1	800	9800
			M4A2	800	14700
			M119A1	800	18100
			M119A2	800	18100
APICM	M449A1	HEC	M3A1	2000	9800

Projectile Category	Projectile Model	TACFIRE TYPE	Propellant Model	Min Range - Meters	Max Range - Meters
			M4A2	2700	14600
			M119A1	6100	18000
			M119A2	6100	18000
DPICM	M483A1	HEF	M3A1	1900	9100
			M4A2	2700	14300
			M119A1	5900	17800
			M119A2	5900	17900
ILLUM	M485A1	ILA	M3A1	2500	9200
			M4A2	3300	14200
			M119A1	6000	17500
			M119A2	6000	17500
	M485A2	ILA	M3A1	2500	9200
			M4A2	3300	14200
			M119A1	6000	17500
			M119A2	6000	17500
HE RAP	M549	HER	M4A2	800	19500
			M119A1	800	23400
			M119A2	800	23500
	M549A1		M4A2	800	19500
			M119A1	800	23400
			M119A2	800	23500
ADAM-Long	M692	APL	M3A1	2800	8800
			M4A2	3200	14200
			M119A1	6400	17800
			M119A2	6400	17800
Copper-head	M712	CPH	M3A1	3000	5400
			M4A2	5400	13000
			M119A1	11000	15500
			M119A2	11000	15500
RAAM-Long	M718	AML	M3A1	2000	9100
			M4A2	2100	14300
			M119A1	3900	17900
			M119A2	3900	17900
	M718A1	AML	M3A1	2000	9100
			M4A2	2100	14300
			M119A1	3900	17900
			M119A2	3900	17900

Projectile Category	Projectile Model	TACFIRE TYPE	Propellant Model	Min Range - Meters	Max Range - Meters
ADAM-Short	M731	APS	M3A1	2800	8800
			M4A2	3200	14200
			M119A1	6400	17800
			M119A2	6400	17800
RAAM-Short	M741	AMS	M3A1	2000	9100
			M4A2	2100	14300
			M119A1	3900	17900
			M119A2	3900	17900

155-MM M109A5/A6, M198

Projectile Category	Projectile Model	TACFIRE TYPE	Propellant Model	Min Range - Meters	Max Range - Meters
HE	M107 DC	HEA	M3A1	800	9800
			M4A2	800	14700
			M119A1	800	18100
			M119A2	800	18100
	M107 NC	HEB	M3A1	800	9800
			M4A2	800	14700
			M119A1	800	18100
			M119A2	800	18100
WP	M110WP	SMA	M3A1	800	9800
			M4A2	800	14700
			M119A1	800	18100
			M119A2	800	18100
	M110A1WP	SMA	M3A1	800	9800
			M4A2	800	14700
			M119A1	800	18100
			M119A2	800	18100
	M110A2WP	SMA	M3A1	800	9800
			M4A2	800	14700
			M119A1	800	18100
			M119A2	800	18100
Smoke	M116A1HC	SMB	M3A1	800	9800
			M4A2	800	14700
			M119A1	800	18100
			M119A2	800	18100
APICM	M449A1	HEC	M3A1	2000	9800

Projectile Category	Projectile Model	TACFIRE TYPE	Propellant Model	Min Range - Meters	Max Range - Meters
			M4A2	2700	14600
			M119A1	6100	18000
			M119A2	6100	18000
DPICM	M483A1	HEF	M3A1	1900	9000
			M4A2	2600	14300
			M119A1	5900	17700
			M119A2	5900	17800
ILLUM	M485A1	ILA	M3A1	2500	9200
			M4A2	3300	14200
			M119A1	6000	17500
			M119A2	6000	17500
	M485A2	ILA	M3A1	2500	9200
			M4A2	3300	14200
			M119A1	6000	17500
			M119A2	6000	17500
HE RAP	M549	HER	M4A2	800	19400
			M119A1	800	23400
			M119A2	800	23400
	M549A1	HER	M4A2	800	19400
			M119A1	800	23400
			M119A2	800	23400
			M203	800	30000
			M203A1	800	30000
ADAM-Long	M692	APL	M3A1	2750	8800
			M4A2	3200	14100
			M119A1	6400	17700
			M119A2	6400	17700
Copper-head	M712	CPH	M3A1	3000	5400
			M4A2	5400	13000
			M119A1	11000	15500
			M119A2	11000	15500
RAAM-Long	M718	AML	M3A1	2000	9100
			M4A2	2100	14300
			M119A1	3900	17900
			M119A2	3900	17900
	M718A1	AML	M3A1	2000	9100
			M4A2	2100	14300

Projectile Category	Projectile Model	TACFIRE TYPE	Propellant Model	Min Range - Meters	Max Range - Meters
			M119A1	3900	17900
			M119A2	3900	17900
ADAM-Short	M731	APS	M3A1	2800	8800
			M4A2	3200	14100
			M119A1	6400	17700
			M119A2	6400	17700
RAAM-Short	M741	AMS	M3A1	2000	9100
			M4A2	2100	14300
			M119A1	3900	17900
			M119A2	3900	17900
HE	M795	HEL	M3A1	800	8900
			M4A2	800	14300
			M119A1	800	17700
			M119A2	800	17700
			M203	800	22200
			M203A1	800	22200
WP2	M825	SMC	M3A1	1500	9300
			M4A2	4100	14400
			M119A1	3500	17800
			M119A2	3500	17800
			M203	3500	22400
			M203A1	3500	22400
	M825A1	SMC	M3A1	1500	9300
			M4A2	4100	14400
			M119A1	3500	17800
			M119A2	3500	17800
			M203	3500	22400
			M203A1	3500	22400
DPICM-BB	M864	HEM	M4A2	3900	17100
			M119A1	4500	22000
			M119A2	4500	22000
			M203	5400	28100
			M203A1	5400	28100
SADARM	M898	SAD	M3A1	2800	8800
			M4A2	3200	14100
			M119A1	6400	17700
			M119A2	6400	17700

Projectile Category	Projectile Model	TACFIRE TYPE	Propellant Model	Min Range - Meters	Max Range - Meters
			M203	8000	20000
			M203A1	8000	20000

203-MM: M110A2

AFATDS PROJECTILE CATEGORY	TACFIRE TYPE (PROJO)	DODAC	PROJECTILE MODEL	MIN RANGE (meters)	WEAPON - MAX RANGE (meters)
HE	HEA	1320-D680	M106 DC	1000	23044
	HEB	1328-D680	M106 NC	1000	23044
APICM	HEC	1320-D684	M684	1000	17260
			M404	1000	17200
DPICM	HEF	1320-D561	M509A1	1000	22910
HE RAP	HEO	1320-D624	M650	1000	24490
	HER	1320-D624	M650	1000	30000

Rocket Missile: M270, M270A1, XM44**

AFATDS PROJECTILE CATEGORY	TACFIRE TYPE (PROJO)	DODAC	PROJECTILE MODEL	MIN RANGE (meters)	WEAPON - MAX RANGE (meters)
MLRS-DPICM	JED	1340-H104	M26	8,000	32,000
Practice Round	JED	1340-H108	M28	8,000	32,000
ATACMS-APAM	JEE	1340-PL81	M39	25,000	165,000
Practice Round	JEH	1340-H185	M28A1	8000	15,000
MLRS-DPICM	JEG	+	M-JEG	15,000	60,000
ATACMS-HE	JEJ	1340-PL65	M48	70,000	300,000
MLRS-DPICM	JEK	+	M-JEK	+	+
	JEL	+	M-JEL	15,000	45,000
	JEM	+	M-JEM	+	+
ATACMS-APAM	JEN	+	M39A1	70,000	300,000
MLRS-DPICM	JEP	+	M-JEP	+	+
	JEQ	+	M-JEQ	+	+
	JER	+	M-JER	+	+
Mine	JML	+	M-JML	+	+

AFATDS PROJECTILE CATEGORY	**TACFIRE TYPE (PROJO)**	**DODAC**	**PROJECTILE MODEL**	**MIN RANGE (meters)**	**WEAPON - MAX RANGE (meters)**
	JMT	+	M-JMT	+	+
	JMU	+	M-JMU	+	+
TGW	JTA	1340-H114	M26 TGW	Classified	Classified
MLRS-SADARM	JTB	1340-H117	M29	Classified	Classified
ATACMS-BAT *	JTC	NA	M39E3	35,000	140,000
TGW	JTD	+	M-JTD	15,000	60,000
	JTE	+	M-JTE	+	+
	JTF	+	M-JTF	+	+
ATACMS-BATP3 *	JTG	+	M39E5	100,000	300,000
	JTH	+	M39E4	35,000	140,000
TGW	JTJ	+	M-JTJ	+	+
	JTK	+	M-JTK	+	+
	JTL	+	M-JTL	+	+
	JTM	+	M-JTM	+	+
MLRS-Smoke	JSA	+	M-JSA	+	+
EFOGM	EFOGM		YMGM-157B	1000	1500

+ Unknown values.
* Only fired from M270A1.
** Only used to fire EFOGM munition category.

81-MM MORTAR: M29A1

AFATDS PROJECTILE CATEGORY	**TACFIRE TYPE (PROJO)**	**DODAC**	**PROJECTILE MODEL**	**MIN RANGE (meters)**	**WEAPON - MAX RANGE (meters)**
HE	HEA	1315-C256**	M374	69	4343
		1315-C869***	M374A2	69	4343
			M374A3	73	4764
	HEB	1315-C222**	M362A1	297	3618
		1315-C223***			

AFATDS PROJECTILE CATEGORY	TACFIRE TYPE (PROJO)	DODAC	PROJECTILE MODEL	MIN RANGE (meters)	WEAPON - MAX RANGE (meters)
WP	SMA	1315-C276**	M375	69	4343
			M375A2	73	4764
			M375A3	454	4800
			M370	274	3646
ILLUM	ILA	1315-C226	M301A1/A2	250	3150
		1315-C276	M301A3	100	2950

81-MM MORTAR: M252

AFATDS PROJECTILE CATEGORY	TACFIRE TYPE (PROJO)	DODAC	PROJECTILE MODEL	MIN RANGE (meters)	WEAPON - MAX RANGE (meters)
HE	HEA	1315-C869	M889/A1	83	5608
	HEB	1315-C868	M821		
RP	SMB	1315-C870	M819	300	4875
ILLUM	ILA	1315-C871	M853A1	300	5050
Training, Long Range	HRR	1315-C875	M879	73	5761
Training, Short Range	HRO	1315-C876	M880	110	480

107-MM MORTAR: M30 (4.2 in)

AFATDS PROJECTILE CATEGORY	TACFIRE TYPE (PROJO)	DODAC	PROJECTILE MODEL	MIN RANGE (meters)	WEAPON - MAX RANGE (meters)
HE	HEA	1315-C704	M329A1	920	5650
	HEB	1315-C697	M329A2	770	6840
WP	SMA	1315-C708	M328 M328A1	920	5650
ILLUM	ILA	1315-C706	M335A2	400	5490
CS	CSA	1315-C710	M630	60	5650

120-MM MORTAR: M285

AFATDS PROJECTILE CATEGORY	TACFIRE TYPE (PROJO)	DODAC	PROJECTILE MODEL	MIN RANGE (meters)	WEAPON - MAX RANGE (meters)
HE	HEA	1315-C623	M933	200	7200
	HEB	1315-C379	M934	200	7200
WP	SMA	1315-C624	M929	200	7200
ILLUM	ILA	1315-C625	M930	200	7100

* Minimum Range is used primarily for Planning purposes (i.e. not as a limitation during mission processing). In the context of the Current Situation, the Min Range stated in this table should only be used in the absence of Friendly Unit Information (Min Range).
** Projectile comes with PD fuze
*** Projectile comes without fuze

Table K-3. Max Apogee Data

105MM M101A1 Low Angle

Proj Model	1/3 Range	Max Ap - (m)	2/3 Range	Max Ap - (m)	Max Range	Max Ap - (m)
M1DC	3670	500	7339	1100	11009	2500
M1NC	3670	500	7339	1100	11009	2500
M60WP	3670	600	7339	1100	11009	3500
M60A1WP	3670	600	7339	1100	11009	3500
M60A2WP	3670	600	7339	1100	11009	3500
M84A1/HC	3670	500	7339	1100	10500	4500
M314A3	2791	900	5583	1100	8374	5400
M444	3670	500	7339	1000	11009	6100
M548	4833	300	9667	1300	14500	8700
M916	3667	600	7333	1100	11000	5700

105MM M101A1 High Angle

Proj Model	1/3 Range	Max Ap - (m)	2/3 Range	Max Ap - (m)	Max Range	Max Ap - (m)
M1DC	3670	2300	7339	4500	11009	4600
M1NC	3670	2300	7339	4500	11009	4600
M60WP	3670	2100	7339	4500	11009	3700
M60A1WP	3670	2100	7339	4500	11009	3700

Proj Model	1/3 Range	Max Ap - (m)	2/3 Range	Max Ap - (m)	Max Range	Max Ap - (m)
M60A2WP	3670	2100	7339	4500	11009	3700
M84A1/HC	3670	2300	7339	4500	10500	4600
M314A3	2791	2700	5583	5400	8374	4100
M444	3670	3000	7339	6100	11009	4200
M548	6500	9300	9667	8700	14500	5800
M916	3667	2700	7333	5700	9500	4400

105MM M102 Low Angle

Proj Model	1/3 Range	Max Ap - (m)	2/3 Range	Max Ap - (m)	Max Range	Max Ap - (m)
M1DC	3822	700	7643	1200	11465	3100
M1NC	3822	700	7643	1200	11465	3100
M60WP	4033	700	8067	1400	12100	3100
M60A1WP	4033	700	8067	1400	12100	3100
M60A2WP	4033	700	8067	1400	12100	3100
M84A1/HC	3822	700	7643	1200	11465	3100
M314A3	3053	900	6105	1200	9158	2900
M444	3822	700	7643	1300	11465	2900
M548	5103	400	10207	1400	15310	4800
M916	3667	600	7333	1100	11000	2700

105MM M102 High Angle

Proj Model	1/3 Range	Max Ap - (m)	2/3 Range	Max Ap - (m)	Max Range	Max Ap - (m)
M1DC	3822	2200	7643	5000	11465	4800
M1NC	3822	2200	7643	5000	11465	4800
M60WP	4033	2600	8067	4800	12100	4700
M60A1WP	4033	2600	8067	4800	12100	4700
M60A2WP	4033	2600	8067	4800	12100	4700
M84A1/HC	3822	2200	7643	5100	11465	4700
M314A3	3053	3300	6105	6000	9158	4300
M444	3822	2800	7643	4900	11465	5000
M548	7000	10200	10207	9900	15310	6600
M916	3667	3400	7333	6600	11000	4900

105MM M119A1 Low Angle

Proj Model	1/3 Range	Max Ap - (m)	2/3 Range	Max Ap - (m)	Max Range	Max Ap - (m)
M1DC	3822	500	7643	1100	11465	3400
M1NC	3822	500	7643	1100	11465	3400
M60WP	4033	600	8067	1000	11000	2600
M60A1WP	4033	600	8067	1000	11000	2600
M60A2WP	4033	600	8067	1000	11000	2600
M84A1/HC	3822	500	7643	1100	11465	3500
M314A3	3053	900	6105	1200	9000	2900
M444	3822	600	7643	1000	11000	3000
M548	5103	300	10207	1400	15000	4500
M760DC	10000	1300	10000	1300	14706	3700
M760NC	10000	1300	10000	1300	14706	3700
M913	12000	1400	13487	1900	19500	6400
M915	9333	3200	9333	1200	14000	4200
M916	3667	500	7333	1100	10500	2900

105MM M119A1 High Angle

Proj Model	1/3 Range	Max Ap - (m)	2/3 Range	Max Ap - (m)	Max Range	Max Ap - (m)
M1DC	3822	2600	7643	4800	11465	4100
M1NC	3822	2600	7643	4800	11465	4100
M60WP	4033	2400	8067	6400	11000	4900
M60A1WP	4033	2400	8067	6400	12100	4900
M60A2WP	4033	2400	8067	6400	12100	4900
M84A1/HC	3822	2600	7643	4800	11465	4000
M314A3	3054	3000	6105	5700	9000	4000
M444	3822	2600	7643	6400	11465	4500
M548	7000	9800	10207	9200	15310	6500
M760DC	10000	8200	10000	8200	14706	6100
M760NC	10000	8200	10000	8200	14706	6100
M913	12000	1400	13487	13200	20230	9600
M915	8000	9000	9333	8700	14000	6000
M916	3667	3100	7333	6300	11000	4400

155MM M114A2 Low Angle

Proj Model	1/3 Range	Max Ap - (m)	2/3 Range	Max Ap - (m)	Max Range	Max Ap - (m)
M107DC	4873	700	9747	1500	14620	4800
M107NC	4873	700	9747	1500	14620	4800
M110WP	4873	700	9747	1500	14620	4900
M110A1WP	4873	700	9747	1500	14620	4900
M110A2WP	4873	700	9747	1500	14620	4900
M116A1HC	4873	700	9747	1500	14620	4900
M449A1	4873	700	9747	1300	14620	3800
M483A1	4717	700	9433	1300	14150	5900
M485A1	4697	1000	9393	1600	14090	5100
M485A2	4697	1000	9393	1600	14090	5100
M549	6457	300	12913	1500	19370	7000
M549A1	6457	300	12913	1500	19370	7000
M692	4717	900	9433	1400	14150	4500
M712	5467	700	10933	1900	16400	1900
M718	4717	600	9433	1100	14150	4500
M718A1	4717	600	9433	1100	14150	4500
M731	4717	900	9433	1400	14150	4500
M741	4717	600	9433	1100	14150	4500
M741A1	4717	600	9433	1100	14150	4500
M825	4717	5800	9433	5800	14150	5800
M898	4400	5400	8800	5400	13200	5400

155MM M114A2 High Angle

Proj Model	1/3 Range	Max Ap - (m)	2/3 Range	Max Ap - (m)	Max Range	Max Ap - (m)
M107DC	4873	3200	9747	6200	14620	5200
M107NC	4873	3200	9747	6200	14620	5200
M110WP	4873	3100	9747	6100	14620	5100
M110A1WP	4873	3100	9747	6100	14620	5100
M110A2WP	4873	3100	9747	6100	14620	5100
M116A1HC	4873	3200	9747	6200	9747	4900
M449A1	4873	3200	9747	8500	9433	8500
M483A1	4717	3800	9433	5900	9393	5900
M485A1	4697	3400	9393	6200	9393	6200
M485A2	4697	3400	9393	6200	14090	6200
M549	6457	12000	12913	12000	19370	7400
M549A1	6457	12000	12913	12000	19370	7400

Proj Model	1/3 Range	Max Ap - (m)	2/3 Range	Max Ap - (m)	Max Range	Max Ap - (m)
M692	4717	2500	9433	5900	14150	5000
M712	5467	3300	8433	2700	16400	2700
M718	4717	2600	9433	6000	14150	5100
M718A1	4717	2600	9433	6000	14150	5100
M731	4717	2500	9433	5900	14150	5900
M741	4717	2600	9433	6000	14150	5100
M741A1	4717	2600	9433	6000	14150	5100
M825	4717	8200	9433	8200	14150	8200
M898	4400	11100	8800	11100	13200	11100

155MM M109A2/A3 Low Angle

Proj Model	1/3 Range	Max Ap - (m)	2/3 Range	Max Ap - (m)	Max Range	Max Ap - (m)
M107DC	6054	900	12108	2100	18162	5800
M107NC	6054	900	12108	2100	18162	5800
M110WP	6054	900	12108	2100	18162	5700
M110A1WP	6054	900	12108	2100	18162	5700
M110A2WP	6054	900	12108	2100	18162	5700
M116A1HC	6054	900	12108	2200	18162	5800
M449A1	6054	1000	12108	2300	18162	6200
M483A1	5971	1000	11942	2200	17913	5900
M485A1	5868	1200	11735	1900	17603	6000
M485A2	5868	1200	11735	1900	17603	6000
M549	7854	600	15709	2700	23563	8300
M549A1	7854	600	15709	2700	23563	8300
M692	5971	1100	11942	1700	17913	6000
M712	5333	700	10667	1900	15500	3700
M718	5971	1000	11942	2100	17913	5500
M718A1	5971	1000	11942	2100	17913	5500
M731	5971	1100	11942	1700	17913	6000
M741	5971	1000	11942	2100	17913	5500
M741A1	5971	1000	11942	2100	17913	5500
M795	5894	1000	11788	2000	17682	5200
M825	5971	1000	11942	1800	17913	5800
M825A1	5971	1000	11942	1800	17913	5800
M864	7334	600	14668	1800	22002	7600
M898	6033	1200	12067	2000	17000	5400

155MM M109A2/A3 High Angle

Proj Model	1/3 Range	Max Ap - (m)	2/3 Range	Max Ap - (m)	Max Range	Max Ap - (m)
M107DC	6054	4300	12108	8200	18162	8200
M107NC	6054	4300	12108	8200	18162	8200
M110WP	6054	4200	12108	8100	18162	8300
M110A1WP	6054	4200	12108	8100	18162	8300
M110A2WP	6054	4200	12108	8100	18162	8300
M116A1HC	6054	4400	12108	8200	18162	8100
M449A1	6054	4200	12108	8100	18162	7800
M483A1	5971	3700	11942	7800	17913	7600
M485A1	5868	5700	11735	11600	17603	8300
M485A2	5868	5700	11735	11600	17603	8300
M549	10500	11800	15709	11600	23563	11700
M549A1	10500	11800	15709	11600	23563	11700
M692	5971	5200	11942	11300	17913	7700
M712	5333	3800	10000	6900	12000	5000
M718	5971	3700	11942	7800	17913	8000
M718A1	5971	3700	11942	7800	17913	8000
M731	5971	5200	11942	11300	17913	7700
M741	5971	3700	11942	7800	17913	8000
M741A1	5971	3700	11942	7800	17913	8000
M795	5894	3400	11788	8000	17682	8300
M825	5971	3700	11942	8200	17913	7700
M825A1	5971	3700	11942	8200	17913	7700
M864	9000	10500	14668	13800	22002	9300
M898	6033	5100	12067	11100	17000	8300

155MM M109A5/A6 Low Angle

Proj Model	1/3 Range	Max Ap - (m)	2/3 Range	Max Ap - (m)	Max Range	Max Ap - (m)
M107DC	6026	900	12051	2100	18077	5700
M107NC	6026	900	12051	2100	18077	5700
M110WP	6026	900	12051	2100	18077	5600
M110A1WP	6026	900	12051	2100	18077	5600
M110A2WP	6026	900	12051	2100	18077	5600
M116A1HC	6026	900	12051	2100	18077	5800
M449A1	6026	1000	12051	2300	18077	6100
M483A1	5941	1100	11882	2100	17823	5800
M485A1	5868	1200	11735	1900	17603	6100

Proj Model	1/3 Range	Max Ap - (m)	2/3 Range	Max Ap - (m)	Max Range	Max Ap - (m)
M485A2	5868	1200	11735	1900	17603	6100
M549	7831	600	15662	2700	23493	8200
M549A1	10106	900	20211	2700	30317	13300
M692	5941	1100	11882	1700	17823	6000
M712	5333	700	10667	1900	15000	3400
M718	5941	1000	11882	2100	17823	5500
M718A1	5941	1000	11882	2100	17823	5500
M731	5941	1100	11882	1700	17823	6000
M741	5941	1000	11882	2100	17823	5500
M741A1	5941	1000	11882	2100	17823	5500
M795	7516	1300	15033	2900	22300	7600
M825	7454	1200	14907	2900	17500	5300
M825A1	7454	1200	14907	2900	17500	5300
M864	9248	900	18497	3700	27745	8900
M898	7378	1300	14755	2300	21000	6700

155MM M109A5/A6 High Angle

Proj Model	1/3 Range	Max Ap - (m)	2/3 Range	Max Ap - (m)	Max Range	Max Ap - (m)
M107DC	6026	4300	12051	8200	18077	8100
M107NC	6026	4300	12051	8200	18077	8100
M110WP	6026	4200	12051	8200	18077	8300
M110A1WP	6026	4200	12051	8200	18077	8300
M110A2WP	6026	4200	12051	8200	18077	8300
M116A1HC	6026	4300	12051	8400	18077	8100
M449A1	6026	4200	12051	8200	18077	7900
M483A1	5941	3600	11882	7800	17823	7600
M485A1	5868	5600	11735	11500	17603	8100
M485A2	5868	5600	11735	11500	17603	8100
M549	10500	12900	15662	11600	23493	11600
M549A1	11100	12800	23000	22300	30317	16800
M692	5941	5100	11882	11200	17823	7700
M712	5333	3800	11000	6300	12000	5000
M718	5941	3600	11882	7900	17823	7900
M718A1	5941	3600	11882	7900	17823	7900
M731	5941	5100	11882	11200	17823	7700
M741	5941	3600	11882	7900	17823	7900
M741A1	5941	3600	11882	7900	17823	7900
M795	7516	4500	15033	10200	22549	10700

Proj Model	1/3 Range	Max Ap - (m)	2/3 Range	Max Ap - (m)	Max Range	Max Ap - (m)
M825	7454	4600	14907	9900	22361	7900
M825A1	7454	4600	14907	9900	22361	7900
M864	9248	10400	18497	12200	27745	14600
M898	7378	6900	14755	14800	21000	11600

155MM M198 Low Angle

Proj Model	1/3 Range	Max Ap - (m)	2/3 Range	Max Ap - (m)	Max Range	Max Ap - (m)
M107DC	6091	800	12183	2100	17774	5300
M107NC	6091	800	12183	2100	17774	5300
M110WP	6091	800	12183	2100	18274	5100
M110A1WP	6091	800	12183	2100	18274	5100
M110A2WP	6091	800	12183	2100	18274	5100
M116A1HC	6091	800	12183	2100	17774	5300
M449A1	6091	900	12183	1600	17774	5500
M483A1	6011	700	12022	1400	17533	5300
M485A1	6011	1200	12022	2000	17533	6200
M485A2	6011	1200	12022	2000	17533	6200
M549	7914	400	15828	2800	23242	7900
M549A1	10106	900	20211	2700	30317	13300
M692	6011	1000	12022	1700	17533	5500
M712	5333	600	9667	1900	16000	1700
M718	6011	700	12022	1400	17533	5100
M718A1	6011	700	12022	1400	17533	5100
M731	6011	1000	12022	1700	17533	5500
M741	6011	700	12022	1400	17533	5100
M741A1	6011	700	12022	1400	17533	5100
M795	7417	1100	14833	2700	22250	7500
M825	7454	1200	14907	2900	17500	5300
M825A1	7454	1200	14907	2900	17500	5300
M864	9395	900	18789	3800	28184	11100
M898	7481	1300	14961	2300	22156	7500

155MM M198 High Angle

Proj Model	1/3 Range	Max Ap - (m)	2/3 Range	Max Ap - (m)	Max Range	Max Ap - (m)
M107DC	6091	4100	12183	7900	17774	8200

Proj Model	1/3 Range	Max Ap - (m)	2/3 Range	Max Ap - (m)	Max Range	Max Ap - (m)
M107NC	6091	4100	12183	7900	17774	8200
M110WP	6091	4000	12183	7900	18274	7100
M110A1WP	6091	4000	12183	7900	18274	8200
M110A2WP	6091	4000	12183	7900	18274	7100
M116A1HC	6091	4100	12183	7900	17774	8200
M449A1	6091	4000	12183	11300	17774	8100
M483A1	6011	4900	12022	11000	17533	7700
M485A1	6011	5400	12022	11200	17533	7700
M485A2	6011	5400	12022	11200	17533	7700
M549	7914	11200	15828	11200	23242	11500
M549A1	11100	12800	23000	22300	30317	16800
M692	6011	4900	12022	11000	17533	7800
M712	5333	3500	10667	6800	16000	6000
M718	6011	4900	12022	11000	17533	8000
M718A1	6011	4900	12022	11000	17533	8000
M731	6011	4900	12022	11000	17533	7800
M741	6011	4900	12022	11000	17533	8000
M741A1	6011	4900	12022	11000	17533	8000
M795	7417	4300	14833	10100	22250	10500
M825	7454	4600	14907	9900	22361	7900
M825A1	7454	4600	14907	9900	22361	7900
M864	9395	10200	18789	11900	28184	13000
M898	7481	6700	14961	14600	22156	10800

203MM M110A2 Low Angle

Proj Model	1/3 Range	Max Ap - (m)	2/3 Range	Max Ap - (m)	Max Range	Max Ap - (m)
M106DC	7681	900	15363	2200	20500	6400
M106NC	7681	900	15363	2200	20500	6400
M404	5733	1000	11467	1700	16500	4800
M509A1	7637	900	15273	2300	20500	7400
M650	10000	700	20000	3100	26500	10500
M684	5753	1000	11507	1700	16500	4800

203MM M110A2 High Angle

Proj Model	1/3 Range	Max Ap - (m)	2/3 Range	Max Ap - (m)	Max Range	Max Ap - (m)
M106DC	7681	4900	15363	8700	20500	9500
M106NC	7681	4900	15363	8700	20500	9500
M404	5733	3000	11467	7800	16500	7500
M509A1	7637	4500	15273	12500	20500	8300
M650	10000	5500	20000	17400	26500	13100
M684	5753	3000	11507	7800	16500	7500

Table K-4 Propellant Characteristics

PROPELLANT MODEL	WEAPON CALIBER	DODAC	COLOR	CHARGE INCREMENTS
M67	105MM	1315-C400	NA	1 2 3 4 5 6 7
M176	105MM	1315-C463	NA	3 4 5 6 7
M200	105MM	1315-C473	NA	8
M229	105MM	1315-C546	NA	8
M3A1	155MM	1320-D540	GB	1 2 3 4 5
M4A2	155MM	1320-D541	WB	3 4 5 6 7
M119A1	155MM	1320-D533	WB	8
M119A2	155MM	1320-D533	RB	7
M203	155MM	1320-D532	RB	8
M203A1	155MM	1320-D532	RB	8
M1	203MM	1320-D675	GB	1 2 3 4 5
M2	203MM	1320-D676	WB	5 6 7
M188	203MM	1320-D661	WB	8
M188A1	203MM	1320-D662	WB	8 9

Table K-5 Fuze Model Characteristics

AFATDS FUZE MOD	FUZE DESCRIPTION	AFATDS FUZE CAT	TACFIRE CODE	DODAC
		FA/Mortar Fuzes		
M557	Impact/Delay	PD/Delay	PDA/PDAD	1390-N335
M572	Impact/Delay	PD/Delay	PDF/PDFD	1390-N311

AFATDS FUZE MOD	FUZE DESCRIPTION	AFATDS FUZE CAT	TACFIRE CODE	DODAC
M739	Impact/Delay	PD/Delay	PDB/PDBD	1390-N340
M739A1	Impact/Delay	PD/Delay	PDB/PDBD	1390-N341
M78	Delay	CP	PDCD	1390-N330
M78A1	Impact/Delay	CP	PDC/PDCD	1390-N331
MK399mod1	Impact/Delay	CP	PDE/PDED	1390-N347
M564	MTSQ (Time)	TIME	TIA	1390-N278
M577	MTSQ (Time)	TIME	TIB	1390-N335
M577A1	MTSQ (Time)	TIME	TIB	1390-N336
M548	MTSQ (Time)	TIME	TIC	1390-N282
M582	MTSQ (Time)	TIME	TID	1390-N286
M582A1	MTSQ (Time)	TIME	TID	1390-N286
M565	MT (Time)	TIME	TIF	1390-N248
M767	ET (Time)	TIME	TIG	1390-N290
M762	ET (Time)	TIME	TIH	1390-N289
M513	PROX (VT)	VT	VTAD	1390-N412
M513A1	PROX (VT)	VT	VTA	1390-N412
M513A2	PROX (VT)	VT	VTA	1390-N412
M513B1	PROX (VT)	VT	VTA	1390-N412
M732	PROX (VT)	VT	VTB	1390-N464
M514	PROX (VT)	VT	VTC	1390-N411
M514A1	PROX (VT)	VT	VTC	1390-N462
M514B1	PROX (VT)	VT	VTC	1390-N462
M728	PROX (VT)	VT	VTE	1390-N463
M514A3	PROX (VT)	VT	VTE	1390-N462
M732A2	PROX (VT)	VT	VTF	1390-N291
M48A3	Impact	PD	PDA	NA
M524	Impact	PD	PDA	NA
M524A4	Impact	PD	PDA	NA
M524A5	Impact	PD	PDA	NA
M524A6	Impact	PD	PDA	NA
M521	Impact	PD	PDA	NA
M526	Impact	PD	PDA	NA
M567	Impact	PD	PDA	NA
M716	Impact	PD	PDA	NA
M745	Impact	PD	PDA	NA
M761	Impact	PD	PDA	NA
M935	Impact	PD	PDA	NA
M520	MTSQ (Time)	TIME	TIA	NA
M772	MTSQ (Time)	TIME	TIA	NA
M776	MTSQ (Time)	TIME	TIA	NA
M84	MT (Time)	TIME	TIF	NA

AFATDS FUZE MOD	FUZE DESCRIPTION	AFATDS FUZE CAT	TACFIRE CODE	DODAC
M84A1	MT (Time)	TIME	TIF	NA
M565	MT (Time)	TIME	TIF	NA
M734	MT (Time)	TIME	TIF	NA
M768	MT (Time)	TIME	TIF	NA
M775	MT (Time)	TIME	TIF	NA
M532	PROX (VT)	VT	VTA	NA

NAVAL GUN FUZES

AFATDS FUZE MODEL	AFATDS FUZE CATEGORY	TACFIRE CODE	DODAC
M732	CVT (VT)	N/A	1390-N464
Mk21	DELAY	N/A	1390-N255
Mk25	TIME	N/A	1390-N633
Mk29	PD	N/A	1390-N315
Mk30	PD	N/A	1390-N304
Mk342	TIME	N/A	1390-N250
Mk349	TIME	N/A	1390-N251
Mk357	VT	N/A	1390-N356
Mk358	VT	N/A	1390-N351
Mk359	VT	N/A	1390-D262
Mk360	CVT (VT)	N/A	1390-N352
Mk393	TIME	N/A	1390-N259
Mk403	TIME	N/A	1390-D289
Mk407	PD	N/A	1390-N302
Mk407 Mod 1	PD	N/A	1390-N377
Mk418	VT	N/A	1390-N670
Mk48	PD	N/A	1390-N610
Mk50	TIME	N/A	1390-N240
Mk52	DELAY	N/A	1390-N224
Mk61	TIME	N/A	1390-N613
Mk66	PD	N/A	1390-N616
Mk71	VT	N/A	1390-N448
Mk73	VT	N/A	1390-N625
Mk724	TIME	N/A	DODAC (TBD)

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